THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXVI. No. 1695.] LONDON, NOVEMBER 5, 1895. [47TH YEAR. PRICE 6d.

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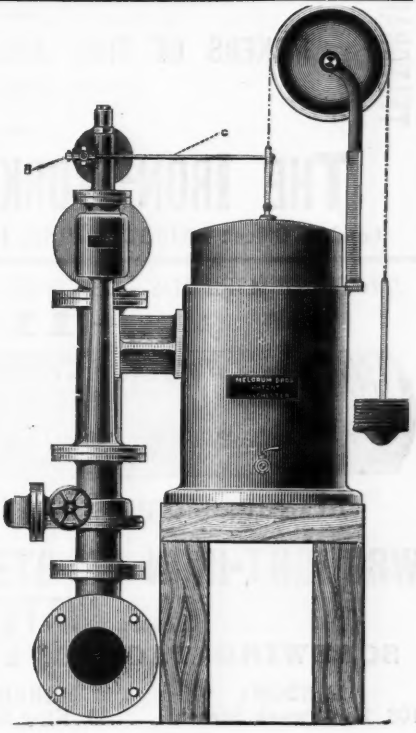

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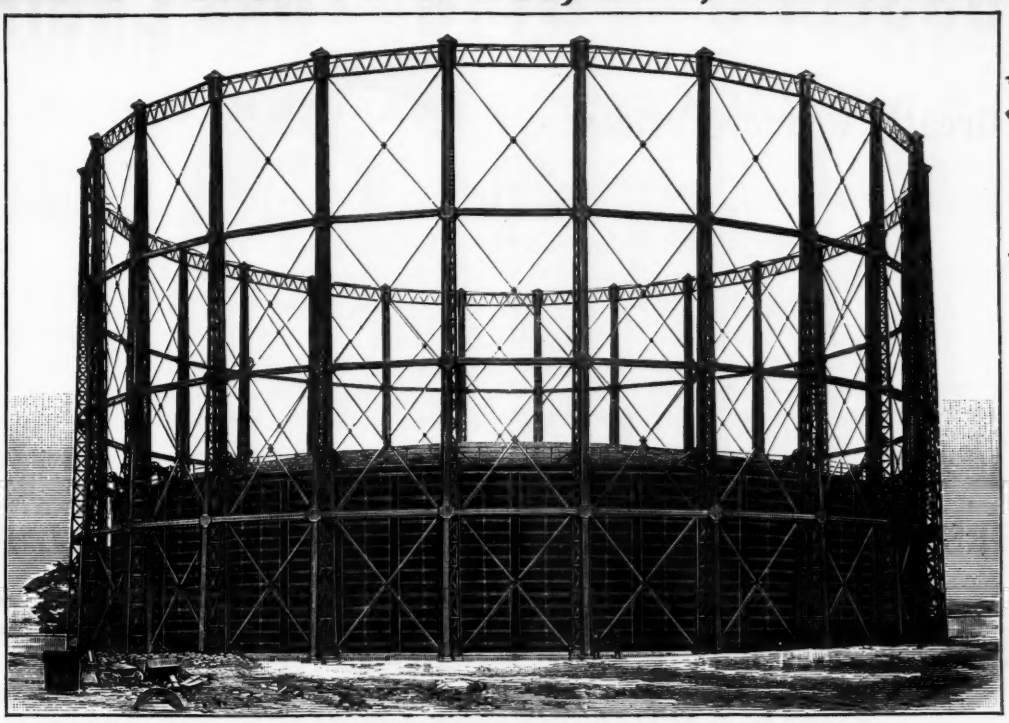

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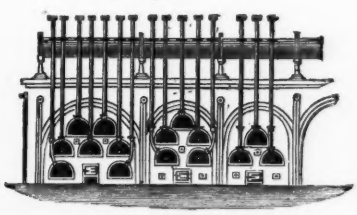

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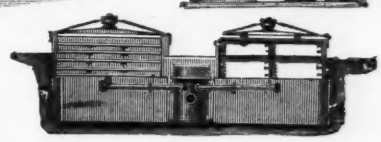

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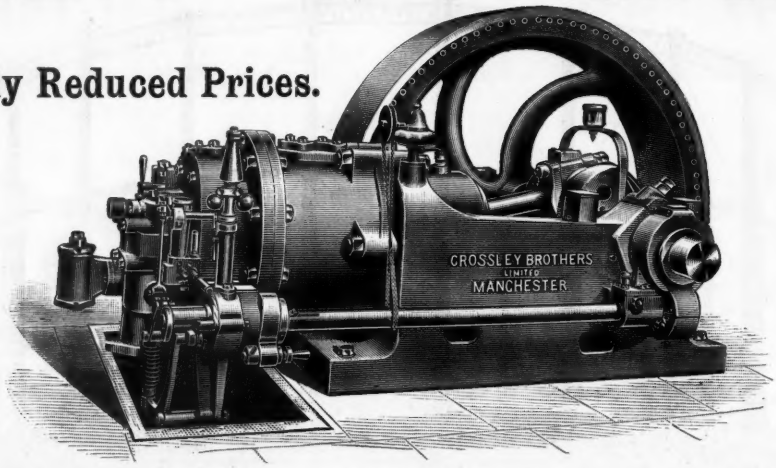

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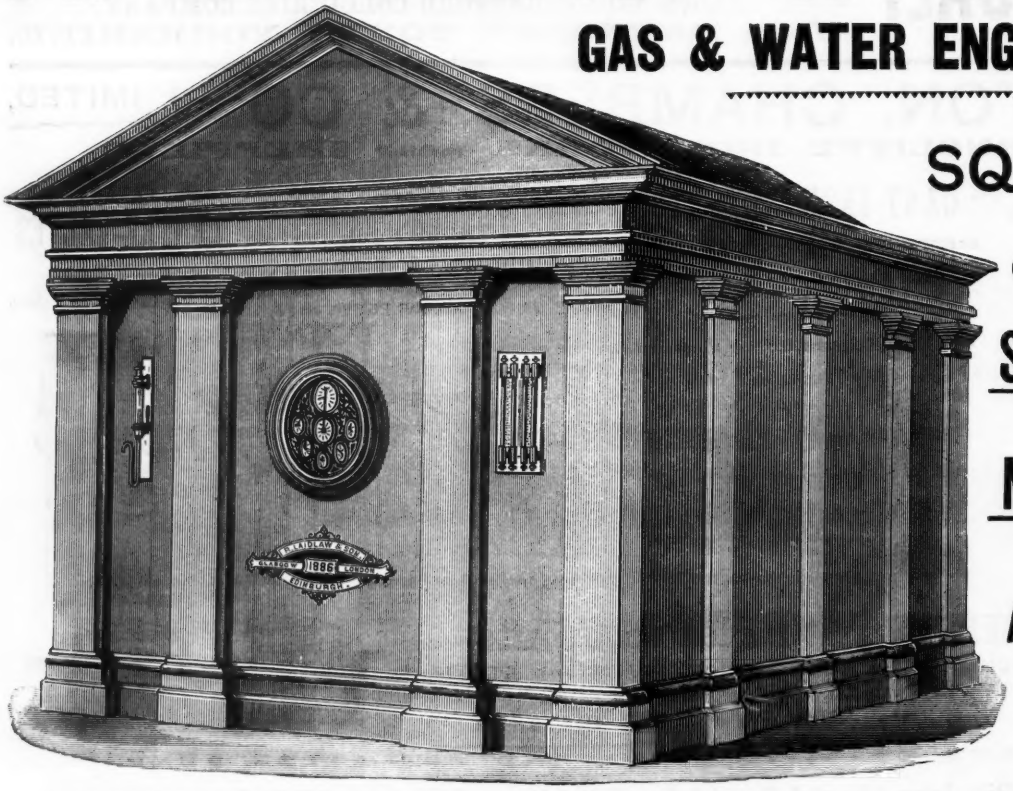

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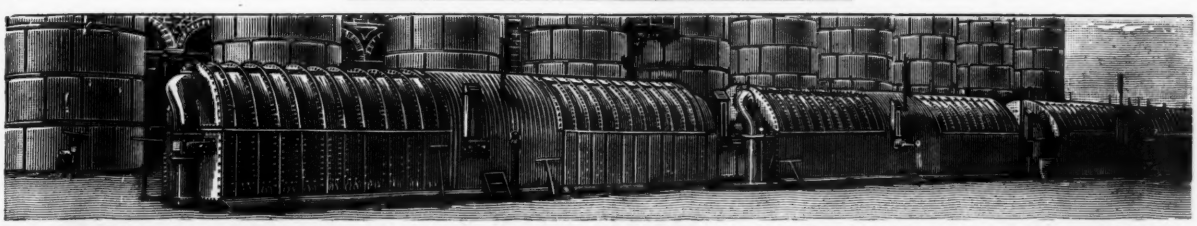

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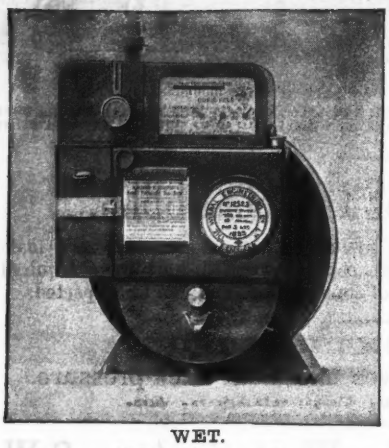

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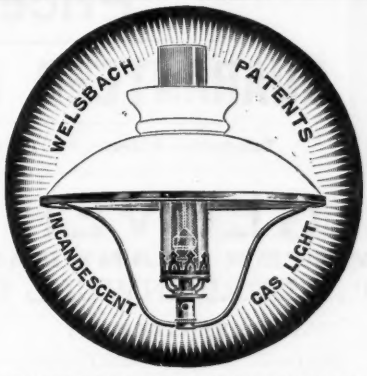

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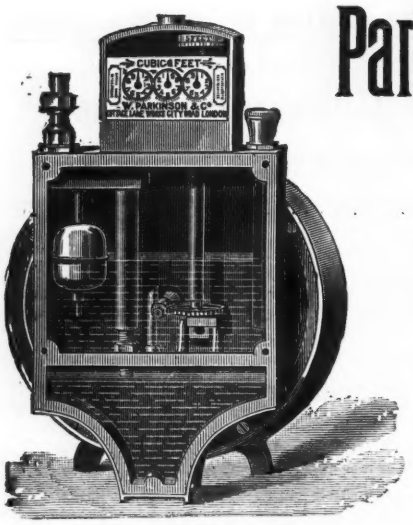

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[See also Advt. p. 952.

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EDITORIAL NOTES.

The Deliverance of Liverpool.

AT length the marching and counter-marching in the English boroughs which precedes the November Municipal Elections are over for another year; and it only remains for the victors to divide the spoils of power, and for the vanquished to find excuses for their defeat. From the point of view of the party politician, last Friday's returns are tinged with the colour of the general parliamentary election results. We should, of course, have nothing to say here respecting this aspect of the municipal elections, but for the regrettable circumstance that, as time passes, questions of gas supply enter more and more into the armoury of the municipal politician. It is fortunately impossible for us to be identified with the cause of the same party in every borough; for the simple reason that no political party possesses the monopoly of sound principles of gas administration. It must, therefore, be understood that, whenever we discuss the influence of political parties upon the gas supply of any locality, we do so purely from the basis of the best interests of the industry and the public; so that it does not make the slightest difference to us whether a particular development of gas politics that comes up for praise or unfavourable criticism in these columns happens to form a "plank" in this, that, or the other local party "platform." With this proviso applied to the salient example of the Liverpool Municipal Elections, it is open to us to congratulate the people of this great city—greater now than ever, by reason of the extension of its boundaries—upon the results of last Friday's contests. Liverpool has been delivered from the rule of those who have rendered the counsels of the Corporation ridiculous; and with them has gone the fatuous project for the establishment of a competitive gas supply.

Strictly speaking, the collapse of Alderman F. Smith's "plan of campaign" against the Gas Company occurred before the election, as will be seen by our report in another column of the proceedings of the old City Council at their last meeting. Like the famous French King, Alderman Smith having marched his forces up the hill, was forced to consent to the ignominy of seeing them all march down again. It appears that the Council, in executing this brilliant manœuvre, committed a bigger piece of banality than was to have been suspected; for they were warned beforehand by the Town Clerk that their resolution to compete with the Gas Company was *ultra vires*. It was a source of wonder to us at the time that the Town Clerk did not prevent the Council from following Alderman Smith's blind lead. But it is only doing this officer justice to put it upon record that he tried in vain to do so. The passage we report elsewhere between the Town Clerk and the Lord Mayor fully exculpates the former from suspicion of having failed to do his duty in this regard, while leaving the Mayor in a very unenviable position. His Lordship seems to have been incapable of properly appreciating either the facts of the question at issue, or the law as rightly expounded by the duly appointed adviser of the Council. The incident ended in the Town Clerk having to correct the Lord Mayor in open meeting; and the circumstance that everything he had to say was unexceptionable, heightens the confusion in which the Lord Mayor and his party are overwhelmed.

It is not true, as the Lord Mayor is reported to have asserted, that a local authority are powerless to redress mismanagement on the part of a statutory Gas Company; and no lawyer occupying the position of Town Clerk could have said as much, and be worthy of the confidence of the public. It is true that the way to seek redress against a statutory Gas Company is not by promoting a competitive undertaking, but by proceeding for an amendment of the Company's statutory powers. This is what the Town Clerk of Liverpool advised, and very properly. Only it is not to be supposed that Parliament can be induced to make such an amendment of a Gas Company's Acts as may be suggested by Dick, Tom, or Harry, be he Alderman of Liverpool or even a more eminent person. The Lord Mayor of Liverpool and his colleagues in this matter seem to have persuaded themselves that they are experts in gas administration, upon the somewhat shaky grounds that they have discovered from a well-known statistical publication what the Liverpool Gas Company paid for coal in the year 1894, and that they entertain the

belief that the price is excessive. What do these gentlemen know about the technics of the local gas supply? It is not too much to say that the misuse of statistical data in this way is a very serious discouragement to those well-wishers of the gas industry and the community who are accustomed to advocate the utmost publicity in respect of the conduct of gas undertakings. The old saw which recommends discrimination as to who should be permitted to handle edged tools comes to mind in this connection.

The chief honours in the game that is being played at Liverpool have been gained by Sir A. B. Forwood. To him belongs the credit for pointing out that the Council, by passing a resolution to which they could not give legal effect, placed the Corporation in a position of antagonism to the Gas Company which must hinder the establishment of those good relations between the two authorities which are so desirable in the interest of the community at large. All this has now been changed. The new City Council will resemble the old one only in name; and under a new Lord Mayor there should be no reason why a good understanding may not be brought about between all the parties interested in the Liverpool Gas Supply. The first step has already been taken towards a new departure in the matter of the appointment of an Auditor of the Company's accounts. The hostility of the old Council to the Company led to the rejection of their nominee for this post, which was eventually given to an independent candidate. Sir A. B. Forwood has, moreover, sketched out a positive policy for the new Council to adopt in their treatment of the gas question, to which we do not believe the Company will oppose any insuperable objection. He proposes, in the first place, that the Company should be approached without hostile intent, and treated as honest dealers; and then that the question of the most economical illuminating power for Liverpool gas should be opened up with a view to a fresh settlement of the point by agreement. Lastly, he favours the introduction into Liverpool of the Sheffield plan of direct representation of the Corporation upon the Board of the Company. These are, at any rate, counsels of fairness and soberness, and such as can be discussed by the parties concerned upon a common ground.

Explosion in the Strand.

An alarming and most destructive explosion occurred in an alley off the Strand, opposite Somerset House, on the evening of last Tuesday, resulting consequentially in the death of a member of the Fire Brigade, and in more or less serious injury to a considerable number of persons. The thoroughfare is called New Church Court, and the houses bordering it are mostly very old, not to say dilapidated, structures let out in tenements, and occupied by market porters and the poorest class of town labourers. In our account of the affair, which will be found in another column, we give some particulars both of the locality and the disaster, which was forthwith reported by the newspapers as being due to an explosion of coal gas. The immediate effect of the explosion was to blow out the fronts of two of the tenement houses, Nos. 26 and 27 in the court, and to set the wreckage on fire. The time was seven o'clock, and it was therefore quite dark, which heightened the terror caused by the report and the rising of clouds of dust and flames from the fallen rubbish. Nobody could tell how it all happened; and, naturally, for a considerable time the most dreadful stories were circulated with respect to the effects of the explosion and consequent collapse of the houses. The explosion may or may not have been a very considerable one in itself; but the fire that followed it was admittedly a small affair. It need not have been much of an explosion to blow out some of the fronts of the houses in which it occurred; and the greatest mischief was due to the fall of the rest of the buildings. The firemen were, of course, on the spot very soon after the first alarm, and the man who was killed—the sole victim, as it happened, although some of the first newspaper reports gave the number of deaths as thirteen—was buried by the falling timbers and rubbish. The only marvel is that nobody else was similarly sacrificed, the neighbourhood being a crowded one, and many people about in and near the court. The hour, however, was favourable to the residents being for the most part out of doors.

At the time of writing, the cause of the explosion remains conjectural. The report of the Chief Officer of the Fire Brigade (Captain Simonds) states that "the "supposed cause of the fire was an explosion of gas;" but nothing has transpired to prove that this was the truth of the matter. There was a 4-inch gas-main passing through the middle of the court, which was flagged; and though the large shops and offices at the corners of the court were supplied with gas, and there was a public lamp in the court itself, the tenement houses were not so served. Of course, this is not to say that gas did not find a way into these buildings; but the curious feature of the case is that, though the opinion has been expressed that "there "must have been a considerable accumulation of gas before "it ignited, as the shock caused by the explosion was "very great, and extended a considerable distance," this supposititious accumulation of gas did not betray its presence in any way before the catastrophe happened. True, one newspaper report states that some men "were "recently engaged in repairing a water-pipe" in the court, and that a tenant of one of the houses said "he noticed "a strong smell of gas on the following day." But the absence of dates from this tale robs it of all significance. Colonel Majendie, of the Home Office, was early on the spot; and it is possible that he may have something to say at the inquest about the explosion. In the meantime, it is only just and reasonable that judgment should be suspended as to what it was that exploded, and how. The damage was so great, and the reported effects so violent, as to lend colour to the suspicion that something more powerful was concerned than the quantity of coal gas that could have accumulated unnoticed in houses in which people were continually going in and out. Be this as it may, and whether or not the truth of the explosion is fated to be ascertained, it was a terrible and lamentable affair, with the sole redeeming feature that if it had occurred at almost any other hour of the day or night, the danger to life would have been far greater.

The American Gaslight Association.

The twenty-third annual meeting of the American Gaslight Association was held in Philadelphia from Oct. 16 to 18, under the presidency of Mr. Walton Clark, of that city, whose address was devoted chiefly to a critical examination of Gas Managers' Associations in general, and the American Association in particular. Mr. Clark is reputed a man with ideas; and his address bears out the author's reputation. A good deal of what he says about the American Association applies with equal force to other organizations of the kind in which our British readers are more particularly interested. He observes, to begin with, that these voluntary Associations of men are as good as the associated deserve; for they are what the associated make them—a profound saying, and one worthy of acceptance by all whom the subject may concern. If an Association lacks the standing and efficiency expected by its founders, and desired by its true friends, it is only because the members prefer to have it as it is, or are incapable of improving it. Mr. Clark does not believe that the American Association is all that it ought to be; and accordingly he takes it upon himself to speak a few home truths respecting the reason why the efficiency of the organization is low. He does not find fault with the papers read before the Association—rightly admitting that among the transactions are to be found many technical memoirs of the highest quality. He does complain, however, in regard to the quality of the discussions. Too few members join in discussing papers; and what they say usually amounts to very little. His is not the only technical society troubled with the same constitutional weakness. The trouble is partly due to the lack of opportunity for preparation; partly to lack of interest; and partly, no doubt, to hurry. Most societies now-a-days follow the plan of distributing prints of papers beforehand, so that members may get up a case for or against the author's views as they may prefer. But what is to be done when, as too often happens, papers trumpeted in advance as of the first importance do not reach the printers' hands before the very eve of the meeting? The circumstance of its being usually the "prominent members" of the society who offend in this way renders all suggested remedies hopeless. With regard to the hurrying of discussions, Mr. Clark declares it a mistake to hold, as most presidents and councils do, that "the greatest good comes from the "reading of all the papers presented, whether or not time "is left for discussion." He believes that "the discussion "of a paper should not be cut to leave time for the reading

"of another; that one paper thoroughly discussed is of "more value to us than many papers without discussion." He is largely right in this regard.

Mr. Clark strongly recommends the establishment by the American Association of technological examinations in gas manufacture on the lines of those conducted by the City and Guilds of London Institute, which he esteems as admirable, but "insufficient to meet the occasion." Surely, it must have been a help to many a student in gas manufacture, as practised across the Atlantic, to learn from the English question-papers what it is that passes for knowledge of the rudiments of the industry. It would be gratifying to know how much farther this kind of educational effort can be extended. Mr. Clark made a considerable number of recommendations to the American Association with the object of improving it, and increasing its usefulness, the fate of which is scarcely doubtful. It is not so much what a technical society professes to do for its members, by remitting all sorts of business to committees with high-sounding names, that renders it respectable; but it is the character and quality of the membership itself that attracts or repels the best element of the personality of the calling which the society pretends to represent. When good men of any order or class of the community are invited to join a club or a society, it is more important to them to know what the company is like than what the organization is called or what is inscribed upon the official programme. The American Gaslight Association, like many others, has suffered, and is still suffering, from commercialism, internecine rivalries, troubles with the national technical press, and one or two other afflictions that need not be mentioned here. But it still numbers among its members some of the brightest and best men in the whole world-wide profession of gas engineering; and while these continue to attend and take part in its meetings, the transactions will not lose interest for the technical world.

"Automatic-Prepayment," or "Coin-Freed"?

WHAT is the most apposite and best descriptive generic term for the gas appliance popularly known as the "penny-in-the-slot" meter? Everybody knows what this phraseology means; but it is unavailable for formal use in patent specifications and in official parlance generally. Week after week our own "Register of Patents" contains entries referring to gas apparatus of this order; but every actual or would-be patentee pleases himself as to how he classifies his invention. Most British applicants use the single word "prepayment," or the couple "auto-"matic prepayment," to indicate the character of their invention in connection with the measurement of gas or other fluid; and nobody has objected to the practice. It is obvious, however, when one stops to think about it, that neither the word "prepayment" nor the two words "automatic prepayment" would convey the idea which is perfectly expressed by the phrase "penny-in-the-slot," to anyone not aware beforehand of the fashion in which the act of prepayment has to be performed, and the way and the degree to which the action is automatic. There might be fifty ways of prepaying for gas through the intermediary of a meter, and several media by means of which the payment could be made. Thus we might have a way of paying for gas in stamps or special tokens prepared for the purpose; and these might control the action of a gas-meter in all sorts of ways. As a matter of fact, however, when we read of an "automatic," or an "automatic prepayment" meter, fancy conjures up, as is intended, the mental picture of a "penny-in-the-slot" device, and no other. A few days ago, we had occasion to chronicle the patenting of a "coin-"freed gas-meter." The phrase is distinctively American, and so was the thing. There is no mistaking what these words mean. Logically speaking, they should be preferred to the more general British title for the same thing—being shorter, more expressive, and less reliant for intelligibility upon an antecedent acquaintance with the special order of mechanical appliances so designated. Which title will survive? Will America supply us with the right word for the thing which we first produced? There is no saying. The point of terminology must be left to settle itself. But, meantime, as at present advised, we incline to the opinion that "coin-freed" is a more explicit title than "auto-"matic-prepayment," as well as being much less trouble to write and pronounce. On the other hand, it is not a very harmonious combination of vowel and consonantal sounds, which is a drawback.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 939.)

THE Stock Exchange has had another very agitating week; and this time all the trouble came from across the Channel. The home settlement, delicate matter as it was, proceeded quite as smoothly as might be expected, and only one or two small failures transpired. But on the Continent things were much rougher. Paris was the focus of the mischief where speculation had been most rampant; and the defeat of the Government just came in the nick of time to make matters worse. To liquidate their mining accounts, the Continental operators sold foreign stocks freely; and the "bears," who were badly in want of an innings, did their best to make things worse, and get up a little panic. The obvious result of this pleasant little game was that prices were knocked about handsomely, and not one of the big departments escaped. Even Consols on Thursday were done at 106⅞—the lowest point touched for a long time. Money, meanwhile, was in demand, and rates were firm. In a general way, business was much interfered with by the closing of the Stock Exchange on Friday; and perhaps the time is ripe for considering whether the May and November holidays might advantageously be abolished. In the Gas Market, business during the earlier portion of the week was at a very low ebb indeed. But it rallied considerably later on, especially in the two largest issues; and Saturday was as busy a day as any. Changes in quotations are few, and for the most part unimportant; and they are all in the upward direction, but one. The exception is Gaslight "A," which opened no stronger than it had closed, and fell to 292 without any symptoms of recovery. The secured issues, however, were firm. South Metropolitans were rather quiet and unchanged. A bargain was done in Commercial old at a fair price; and the position of the new stock was partially remedied by a rise of 5. Among the Suburban and Provincial Companies, business was quiet; but Brighton was conspicuous for good prices. Quotations did not move. In the Continental division, Union recovered its position; and European was steady. Imperial was largely dealt in; but prices showed no improvement. None of the rest presented any feature calling for remark. Dealings in the Water Companies were not extensive; and movements were irregular. Chelsea advanced a point; but Lambeth was in bad odour, and lost ground.

The daily operations were: Business in Gas was very inactive on the opening day; and prices were rather poor on the whole. Quotations were not varied. There was no sign of any greater vitality on Tuesday; transactions continuing much restricted. Continental Union advanced 2; but Gaslight "A" receded 1. On Wednesday, there was considerable revival, though prices showed no disposition to advance; and quotations remained as they were. In Water, Lambeth tens fell 5. Thursday's business was fairly extensive, and at about the old figures. Commercial new advanced 5. Lambeth Water was flat again, and dropped 2 more. On Friday, the Exchange was closed. Re-opening on Saturday, business was quite brisk; but quotations underwent no further change.

ELECTRIC LIGHTING MEMORANDA.

Major Cardew's Report on the Portrush Tramway Fatality—The Trolley Wire and the New Westinghouse Traction System—High Voltage in St. Pancras.

MAJOR CARDEW'S report on the causes which led to the fatal accident that occurred on Aug. 26, upon the Giant's Causeway and Portrush Electric Tramway—when a bicyclist met his death by coming into contact with the charged conductor—is a very grave indictment of the system employed in this undertaking. There has been a good deal of advertisement given at one time and another to this experiment in tramway working, which has been "cried-up" as a successful example of the use of electricity for the purpose. But Major Cardew has found—what visitors to the locality could not fail of observing—that, as a matter of fact, the tramway was chiefly worked by steam-engines. Only a few of the cars were provided with electric motors; so that it was only by a stretch of courtesy that the line could be termed (as it habitually was) an "electric" tramway. Yet, little as electricity has ever done in the way of earning money for the Tramway Company, it has been effective enough in getting them into trouble. Now it is officially condemned; and it is only to be permitted again under conditions which will in all probability be deemed prohibitive. It must be admitted that the system was crude and dangerous in the extreme. The electricity was generated by water-power some distance from the line, to which it was conveyed by overhead wires. The charged conductor, from which the cars took their current, was a stiff iron rail, wholly without protection of any kind, supported at a height of 18 inches above the ground along-

side the line, except at road crossings, where the connection was effected by means of underground cables. Elsewhere there was nothing to prevent people, or cattle, from coming into contact with this rail, which might be at a potential of anything from under 290—the average of Major Cardew's tests—to 360, which was the admitted maximum observed. In the circumstances, there is less cause for wonder that at length somebody was killed upon the conductor than that no such casualty had occurred before August. It has transpired, however, that since the opening of the line four horses and five head of cattle have been killed in this way, and others injured. Major Cardew recommends that the existing charged rail should be removed and replaced by an overhead system, or raised to a height of not less than 8 feet above the ground. Meanwhile, the line must be worked entirely by steam-power.

The circumstances dealt with in the foregoing paragraph are calculated to arouse reflection in the minds of others besides the Directors of the Giant's Causeway and Portrush Tramway Company, with which undertaking the Board of Trade will have more to do yet. Advocates of the newer trolley-wire principle of electric traction will see in the official condemnation of the old system and the implied recommendation of some substitute in their line, a source of encouragement and reason for congratulation. It indeed appears fairly proved that, where electric traction is wanted, the choice of available systems lies between the trolley-wire and the underground conductor, when any consideration of expense must determine the preference in favour of the former. At the same time, whatever electricians may say and desire to the contrary, there exists in English public opinion a rooted objection to the intrusion of the posts and overhead wires requisite for the trolley-wire system into any locality or thoroughfare having the smallest pretensions to good appearance. It may appear strange to people whose ideas in regard to such matters have been moulded by Transatlantic experience, but it is nevertheless true, that the inhabitants of most of our manufacturing towns, who have become reconciled to the steam tramcar, still profess an unconquerable aversion to the trolley-wire. It might be thought by outsiders that there is nothing to spoil in the average trunk thoroughfare connecting a manufacturing centre with an industrial suburb. But the residents in such neighbourhoods are still averse to the intruder in question—possibly because they entertain the reasonable suspicion that it would be difficult to set bounds to the intrusion, if once permitted. It remains to be seen what fortune will attend the latest suggestion that has been put forward with a view to avoiding the eyesore of the overhead wire without involving the expense and difficulty of working an underground conduit necessarily open at top for permitting running contact with the car motors. This is a device brought out by the Westinghouse Company, who are nothing if not progressive, in which the continuous underground conductor is actually buried, presenting only a line of metal studs projecting above the road surface at such intervals that only a suitable bar disposed beneath the tramcars can make temporary rubbing connection from one to another, and so take the current required for the travelling motor. It is claimed for this method of connecting the car to the conduit, that the main circuit can never be closed except by the car itself, so that there is no danger in it for man or beast. There is some little objection to the requirement that the metal studs must stand a regular distance of $\frac{3}{8}$ inch above the general street level—not so much with regard to the ordinary traffic, as to the effect of this traffic upon any such nicely-adjusted appliance. It is amusing to note meantime that those who are recommending this new system, in the interest of the particular firm of electricians who are introducing it, can make mention for their own ends of that "unsightliness of the overhead trolley" which they deny when advocacy of the latter is in question.

Another consideration growing out of the Portrush fatality bears upon the moot point of the expediency of increasing the voltage of low-pressure incandescent lighting circuits from about 100 to 230 or thereabouts. The precise voltage of the current that killed the man who fell across the condemned tramway conductor will never be known. But it was something which showed an average of 290 volts upon testing. It may consequently not have been widely different from the regular voltage that the Electrician to the St. Pancras Vestry (Mr. S. W. Baynes) wishes, for reasons of economy, to establish in this undertaking. There can be no doubt as to the advantage that would accrue to the proprietors of low voltage systems of electric distribution from merely doubling the voltage. Mr. Baynes has recently reported very fully and conclusively to the St. Pancras Vestry upon this head; claiming, among other benefits, that the area that could be covered by the higher voltage service is sixteen times greater than that of the low voltage service, because with the same outlay in copper four times the lighting could be done, or the same lighting duty could be served at four times the distance with the same percentage of loss. It is true that complaints have been made public as to the difficulty of procuring suitable incandescent lamps of moderate lighting power for the high voltage. But this is declared to be a mistake. At any rate, it may be expected that the Board of Trade will have something to say to any electric lighting authority introducing a dangerously high voltage into consumers' premises, though an "accident" may be permitted to occur before anything is done in the matter.

A STUDY OF THE PRESTON GAS-WORKS.

To the gas engineer, one of the peculiar fascinations of his profession is the scope it affords for individuality of treatment of the mass of detail that constitutes modern gas engineering practice. The non-technical observer usually sees nothing in the process of gas making but a shovel-full of coals at one end and a gasholder at the other; and every stage of the operation is to him attended by such unpleasant concomitants of dust, heat, mess, and odour, that he is inclined to set the whole business down in his mind as a rough, dirty, and objectionable performance, undeserving of the name of a scientific industry. This is notoriously the view of gas manufacture taken by writers in the newspapers; and even technical authors not specially instructed in coal-gas making are apt to sneer at it as an essentially coarse, unprogressive industry. None but a trained and sympathetic observer, perhaps, can distinguish the real science that underlies the rough aspect of a modern gas-works; and the "man in the street," who is so prone to be impressed by externals, would never understand that there is in a gas-works occupation enough and to spare for the most painstaking and ingenious of experts. For in gas manufacture, as in all other organized industries, the essence of the thing—its science, that is to say—is in the proper application of means to ends. All gas-works generally resemble each other in respect of both means to be employed and ends to be attained; but this fundamental unity may, and often does, permit of, and require, great variety of detail development. One gas-works is more interesting than another, in expert opinion, in the degree in which it expresses the individuality of the designer and manager, in his proper application of means to ends. Some gas-works are a desert to the skilled observer, because there is nothing in them to show that any more pains have been taken in their arrangement and outfit than are involved in copying good commonplace designs, and employing respectable firms of contractors in carrying them out. It is not size, nor even good commercial working, that gives interest to a gas-works. The competent critic of gas making would rather see a few mistakes (as he might esteem them) made for some show of independent reasoning, than be treated to a dead-level of inexpressive excellence that suggests nothing to ponder over whether as a hint to be worked up or an example to be avoided.

After this exordium, we venture to engage our reader's attention to a brief description of Mr. Henry Green's Moor Lane gas manufacturing station in Preston, which, judged by the standard we have endeavoured to set up, must be regarded as one of the most interesting establishments of the kind in England. This is one of three works belonging to the Preston Gas Company, which has been managed by Mr. Green with credit to himself and advantage to the Company and the town for thirty-four years. Mr. Green's predecessor in office was Mr. Rofe, who ranked, with Mr. Alfred King, of Liverpool, among the most eminent members of the profession in his day. Mr. Green has naturally had a great deal of remodelling and extending to do during his service at Preston; but he has done it all so quietly, and has been so little inclined to put himself forward in places where gas engineers and managers are commonly seen and heard of, that few of his compeers know the quality of his work. A visit to Moor Lane, however, will show that, while Mr. Green is fully abreast of "the movement" in all gas engineering matters, he has attacked familiar problems in his own way, and has made his personal mark upon every department of the works.

The Moor Lane station is situated on rising ground, and consists of two works divided by a thoroughfare. It is with one of these—in which most reconstruction has been effected—that we are to-day chiefly concerned. Among other novelties, this works is being provided with a pair of Messrs. Humphreys and Glasgow's carburetted water-gas generators, rated to manufacture 135,000 cubic feet of gas per day; and as the blowing plant has to be accommodated in the other works, the dividing roadway is now opened for the construction of a subway for the connecting mains. The controlling consideration in the design of the new works is the absence of any other means besides carts of conveying coal and coke, or other materials, into or out of the works. Next in importance came the fact that upon the site of the present retort-house there existed a couple of old gasholders, with tanks going a good depth below the ground level at the entrance gate. To meet the case thus presented, Mr. Green has laid out the new station in three levels, approached from the gate by roads at easy gradients. The lowest level is that of the coke-hold, which is extended to form an open-air coke yard, at a depth of 18 feet below the ground-line, which is that of the charging-floor. Thus the old excavation is utilized. The subsoil of the site being a fine dry sand, there was no difficulty from water in carrying out this arrangement, which affords plenty of head-room for the water-gas plant, and the generator furnaces of the retort-settings which amicably share the same roof. In the adjoining yard are the oil storage tank and the relief gasholder, which is upon the Gadd and Mason spiral-guide principle, in a wrought-iron above-ground tank. The highest road level—14 feet above the ground line—is that of the coal-store approach, which thus enables trimming to be dispensed with. Such is the general

arrangement of the works in respect of coal and coke handling; and, although originally the yard had only one level, the three levels have been so naturally planned that it looks as if these had always existed and grew out of the lie of the land.

Mr. Green believes in single settings of sevens, set with the three middle retorts in line. He lays the courses of bricks in the piers of the arches on a slope towards the inside (somewhat in the style of an inverted arch) so as to help the buckstaves to restrain expansion by offering the brickwork an inclined instead of a horizontal bed to slide upon. The dip-pipes enter a hydraulic main which is run dry when gas is being made; the dips being closeable instead by means of a flat disc-valve actuated by a rod in front, in the usual way. With such an arrangement, of course, the exhauster must be run at zero; regulation being effected by way of the gas, and not of the steam. The gas connections throughout the works are 24 and 18 inches diameter.

The scrubbers are of great height, but of comparatively small diameter; this being one of Mr. Green's special points. He has an arrangement of canvas friction-screens, for filling the scrubber, and a (patented) device for distributing the water over the whole circular area, which works very well, and has done so for many years. It is Mr. Green's practice to arrange his scrubbers so that the amount of friction to which the gas is exposed in passing through them is as great as can be obtained without producing any back-pressure, and he has no faith in scrubbers of large area, however packed. It is obviously essential to the usefulness of canvas screens in scrubbers that they should never be maltreated by having tar poured over them by mistake. Wherever Mr. Green requires to separate tar from ammoniacal liquor, he employs a separator of his own design. The difference between this and a simple box-separator, with a middle partition extending downwards from above the water-line to near the bottom—in which there must be some tar in the liquor or inlet side of the box—consists in the partition being carried down to the bottom and made tight; the connection of the two divisions being effected by a U pipe hanging, and extending some distance, below them. Thus the tar is kept out of the liquor-box, and the latter can be pumped clean.

It is in the matter of purifying that Mr. Green has certainly struck out his most important departure from ordinary practice. At Moor Lane, there is a purifying house in a special sense of the term, inasmuch as in some dimensions the structure is both house and purifier—that is to say, there are two lines of purifiers in the house, and the outside plates of each line are fixed flat up against the wall of the house. Thus, making allowance for the necessary central and other gangways, every available square inch of the area covered by the house is purifier-room. This is made possible by the abandonment of water lutes, and their substitution by plain, flat lids sealed with a simple india-rubber cushion. With Mr. Green, this method of sealing his purifiers dates back some twelve or fourteen years. It should be stated here that Mr. Green does not prefer any claim to priority as having originated the system of dry lids; he only claims to have used it with unequivocal success for at least the period specified. The suggestion came to him originally as a way out of a difficulty. The gas made at the then Moor Lane and other stations had to be pumped a considerable distance into the holders, through mains of insufficient size to take the maximum output of the three works without throwing a back-pressure so heavy as to make the purifiers blow. It appeared, therefore, that the only thing to do was to lay a bigger main, or put the exhausters past the purifiers—either course being open to serious objection on the score of expense and trouble. As a simpler expedient, Mr. Green decided to attack the blowing purifiers; and accordingly he converted at the Walker Street works eight oxide purifiers into two. The purifiers converted consisted originally of eight ordinary water-lute purifiers, worked in two sets of four purifiers each; there being four boxes on each side of the centre gangway. These were turned into two purifiers, by connecting together the various inlet and outlet pipes respectively. The alteration was found to answer the anticipation; the pressure being very considerably reduced. The only difficulty feared from the change was the danger of passing impure gas during the time one set of the combined purifiers was being discharged. It was, however, found in practice, that there was less danger with the gas passing through one layer of clean oxide in a large purifier than through four layers in two small purifiers. It then suggested itself to Mr. Green that a greatly improved purifier could be made, at considerably less cost, if the water-lute lid could be dispensed with, which would enable him to adopt much larger purifiers, to be worked in sets of two. He, therefore, adopted the dry lid as an experiment; and, after many years' use, finding the expedient satisfactory, when the Moor Lane works were remodelled, the system in a perfected form was applied to the new purifiers. The advantages of the system are so considerable that we have deemed it worthy of special illustration; and the views on pp. 922-3 of Mr. Green's 90-feet purifiers being emptied, and ready for work, have accordingly been prepared from photographs.

The house, as will be seen, is light and lofty—the roof, we believe, originally belonged to one of the buildings erected at the Liverpool Exhibition. The purifiers are well above the ground; there being plenty of room for a horse and cart to move about underneath them. Mr. Stelfox's Belfast arrangement of cross-connection boxes is here followed, in order to avoid having two tiers of gas-mains. The main purifiers are a noble pair, each 90 feet long by 35 feet wide, holding two layers of oxide, 15 inches thick. Besides these, there are three smaller boxes for lime, each 30 feet by 35 feet; and a single catch box for oxide, of the same dimensions. These divers boxes, therefore (all upon the same plan), fill the house from end to end. Each of the main boxes has twelve covers; and the others are fitted with lids of the same size—that is, 13 ft. 6 in. by 11 ft. The openings covered by these lids are edged with a planed rim, behind which stand up the 1-inch bolts which hold the covers down. The covers are quite flat, framed with angle iron, on the underside of which a packing of square india-rubber about 1 inch on the face, is secured with the "solution" used by waterproofers. The plate upon which this packing bears is prepared for it by a coating of blacklead, so as to prevent sticking. That is the whole mystery. There is no blowing or leakage; the weight of metal in the purifiers is greatly reduced; the boxes are tied together in every way so that nothing can give; there is nothing to freeze; the weight of the covers is so small that all the lifting can be done by means of a traveller carrying two 1 ton differential chain blocks, which holds up two lids at a time. In one of the illustrations there is shown a block which appears to be holding up a kind of pot. This is a "dummy" cover that goes over the opening of the shoot through which the oxide is discharged down below; and when lifted it gives an opening for the immediate discharge of the contents of the box. Mr. Green estimates the saving due to the abolition of the lute as amounting to one-half the cost of purifiers so fitted, to say nothing of the value of the room economized.

After the unique purifier-house, there is little more to be noticed in the rest of the works devoted to the manufacture of gas, which nevertheless manifest in every detail the forethought and skill of a thorough manager. The sulphate of ammonia plant is, however, certainly deserving of notice. The saturator is wholly constructed of copper. It is circular, with a domed cover, and a conical bottom tapering to an outlet. Once a day steam is shut off; and the contents of the saturator are then run off into a tumbling-box placed below. Here the sulphate drains and dries by its own heat, until it is ready for packing. The operation of emptying the saturator and getting it ready for work again occupies only about seven minutes; and this is all the labour required in discharging the sulphate from the saturator. The saturator is made of copper because lead would not stand the alterations of temperature to which the vessel is subjected, nor would it work kindly into the requisite shape and size.

One or two other points of Mr. Green's gas engineering and management might be mentioned; but we have probably said enough to persuade our technical readers that whatever else might be claimed for them, the works of the Preston Gas Company are interesting to visit and full of instruction for the student of the industry of however ripe a growth. Mr. Green will be found a kindly and candid guide by any sympathetic visitor to his works; for although a natural diffidence, rather than reserve, has kept him from taking any prominent part at gas engineers' meetings, he is always glad to foregather with a kindred spirit, and on such occasions he shows himself to be most instructive and entertaining.

Fires of Electrical Origin in America.—In a paper read before the Fire Underwriters' Association of the North-West, Chicago, Mr. W. H. Merrill stated that a comparison of causes among 815 electrical fires published in the first eight reports shows that 113, or over one-seventh, of these losses were caused by the crossing of telephone, telegraph, and similar wires with trolley or electric light wires. The total loss due to these fires was $324,957 (about £65,000).

Institution of Civil Engineers.—The new session of the Institution will open next Tuesday, by which date it is hoped that the structural alterations which have been going on in connection with the premises in Great George Street will have made sufficient progress to allow of the remodelled theatre being made available not only for the delivery by Sir B. Baker of his Inaugural Address, but for temporary use during the session, at the close of which the work will be completed.

Personal.—Mr. H. P. Harris has been elected Chairman of the Parliamentary Committee of the London County Council in succession to Mr. T. M'Kinnon Wood, whose resignation of the position was mentioned last week.——Sir H. Bodkin Poland, Q.C., has been chosen as an Alderman of the London County Council in place of Mr. C. T. Ritchie, whose acceptance of office under the Government necessitated his resignation.——Mr. A. Denny has been elected President of the Institution of Junior Engineers, in succession to Mr. A. Siemens; and he delivered his Inaugural Address at the opening meeting of the fifteenth session of the Institution on Friday evening.——Mr. Thomas Duxbury, formerly the Manager of the Darwen Corporation Gas-Works was a candidate at the municipal elections in that borough last week. He contested the Central Ward as an "Independent;" but he was defeated by 135 votes. His opponent was Mr. Tomlinson, a colliery agent, who, as a member of the Gas Committee, had a good deal to say about Mr. Duxbury's management of the gas-works.

NOTES.

Use for the Phonograph.

A great deal is heard from time to time of the superior advantages enjoyed by the present generation as compared with our forefathers, by reason of the height to which time and space annihilating appliances have in these latter days been brought. It is not always easy, however, to adduce positive evidence in support of the case for modernity; and therefore considerable interest attaches to a report that has been put in circulation by the Knowles steam-pump works, of New York, concerning the practical use they have been able to make of that brilliant, but hitherto unappreciated invention, the phonograph. It is stated that some years ago this Company put up one of their large pumping engines at the works of a Californian water company. All went well with the machine until recently, when something happened to put the pump wrong. The works' manager thereupon used a phonograph cylinder as a means of communicating news of the trouble to the makers; and he finished up by so exposing the phonograph receiver in the pump-room, that the pulsations of the machinery registered themselves upon the wax roll. When the cylinder was put into the repeating machine at New York, the voice of the Californian water-works engineer was first heard giving his description of the mishap, followed by the characteristic noises made by the pump. Thanks to the latter, the cause of the trouble was immediately diagnosed; and it became possible to warn the user of the machinery as to what was the matter and how to remedy it—thus rendering unnecessary the despatch of skilled assistance from one side of the Continent to the other. Other engineers and works' managers might see their way to similarly using the same appliance.

The Preparation of Graphite.

It is not many years since the form of carbon known as graphite was only to be obtained from the incrustation upon the inside surfaces of gas-retorts; and the term "gas-retort carbon" is still occasionally employed by writers who mean to refer to what is really graphitic carbon. Numerous experiments—in particular those of M. Moissan—with the electric furnace, have now proved that graphite is the most stable form of carbon at high temperatures, and is in fact the form to which all other descriptions of carbon can be brought at a proper temperature. The best way of making graphite is by means of the electric furnace; but this has hitherto been also the most expensive process. Messrs. Girard and Street, engineers to a French manufacturing society, claim to have successfully overcome this difficulty of cost, and to be able to transform powdered carbonaceous material into graphite electrically, at an expenditure of current not too great to prejudice the commercial utility of the process. Their apparatus consists of an arrangement of refractory blocks, through which passes a rod or tube of the material to be converted into graphite, and a set of carbons for striking the electric arc across this tube or rod. An equable distribution of the heat is effected by causing a magnet to rotate the electric arc, according to a well-known principle. A stream of hydrocarbon gas can at the same time be passed through the furnace, which thus reproduces—although at a much higher temperature, and through a shorter period of time—the conditions under which graphite is formed in a gas-retort. The new process, however, can hardly be a cheap one where the electric energy is not produced by water power.

The Reverse of Generator Firing.

An interesting illustration of the reversibility of thermic conditions is given in two recent numbers of *Nature*. In the first, Mr. E. Blass writes from Essen-Ruhr, Germany, stating that Siemens taught us how, by using the heat of the gases escaping from a furnace to heat the gas and air before entering the furnace, we could obtain temperatures limited only by the fire-resisting quality of the materials of which the furnace is constructed. It had occurred to Mr. Blass, that very low temperatures might be reached upon the same principle. It would only be necessary to reverse the operation of the Siemens furnace, with compressed cooled air in place of the furnace gases, to get lower and lower down in the scale of temperature. The idea is, that as compressed air in expanding to atmospheric pressure does work and is cooled to a corresponding extent, it would only be necessary to keep up a continuous supply of compressed air through a tube made of a good conductor of heat, and allow it to escape at one end and expand between the exterior of this tube and the interior surface of an enclosing tube of non-conducting material. In passing over the outside of the inner tube, the expanding air would obviously cool the supply of compressed air more and more. Mr. Blass asked what would be the limit of low temperature that could be reached in this way. In the later number of the same journal, there appeared a letter from Mr. E. T. Dixon, of Cambridge, which stated that Herr Linde has succeeded in making a machine upon this principle which produces liquid air and oxygen upon a commercial scale. At the very first trial of the machine, about eight litres of liquid air (the fluid being slightly blue in colour) were obtained. When this liquid had again become gaseous, it was analyzed, with the result of showing that it contained 70 per cent. of oxygen, instead of the 21 per cent. normal in atmospheric air. It was evident, therefore, that a segregation of the elements of the air had taken place. What had happened was, simply, that the nitrogen had boiled off first, leaving the oxygen behind it. It is therefore possible to obtain oxygen from the air by purely mechanical means. The preparation of liquefied air is only a stage in this new oxygen process. The cost of the oxygen is the cost of compression, which with the first machines works out to a yield of about 1 cubic metre of 70 per cent. oxygen per horse power per hour. The *Engineer*, commenting upon the process, shows that this is equivalent to about 14d. per 1000 cubic feet of oxygen of this standard. The whole story is a most remarkable one in all its aspects.

The Boiling Point of Hydrogen.

If liquid air, produced by the Linde process, is to be a common article of commerce in the immediate future, liquid hydrogen is still sufficiently novel to attract the attention of the man of pure science. Professor Olszewski has recently determined the boiling-point and the critical temperature of hydrogen; and the result shows that it is possible, by taking proper precautions, to do experimental work in the domain of physics at a point very near the absolute zero of temperature. The process is described in detail in *Wiedemann's Annalen*. The method of expansion, which had already been successfully employed to ascertain the critical pressure, was again utilized. The critical temperature being that at which liquid hydrogen, when slowly released from pressure, first boils up; and the boiling point is the temperature reached when the pressure is reduced to that of one atmosphere. The chief difficulty in these experiments is the thermometric one; and Professor Olszewski successfully overcame this by the employment of a thin platinum wire immersed in the liquid hydrogen, which by its varying resistance indicated the fall of temperature. It is interesting to note, in connection with what has been stated with regard to the effect of cold upon the strength of materials, that Professor Olszewski used cast-iron cylinders brought down to a temperature of — 210° C. (not far from the absolute zero) by means of liquid oxygen, at which the cylinders still held hydrogen compressed to 180 atmospheres. The critical temperature of the hydrogen was, however, still lower, and was not reached until — 234·5° C. had been registered. The boiling point was — 243·5° C., or — 406·3° Fahr., (probably the greatest cold ever attained by artificial means).

A Statue to Sir Isaac Newton is to be erected by the Municipal Council of Paris. Referring to this matter, *Nature* says: "We cannot imagine the London County Council paying a similar graceful tribute to the greatness of one of France's renowned investigators—say, Laplace or Lavoisier; but we dare to suggest that the action of the Paris Municipality ought to be reciprocated."

Hygienic Decision on Potable and Household Waters.—At the last general meeting of the German Association for the Care of Public Health, Professor Flügge put forward the following propositions: (1) The customary hygienic decision on waters simply on the basis of a chemical, bacteriological, and microscopic examination of samples sent, is in almost every case to be rejected. (2) A single examination of water as to its admissibility for drinking or domestic consumption must, above all things, be followed by a visit of inspection to the place where the sample was taken. In many cases, this examination alone leads to a conclusion that it may be supplemented by microscopic inspection, and a determination of the hardness and the iron. In new installations, freedom of the water from micro-organisms should be ascertained. (3) The hygienic significance of remarkable analytical results can be generally ascertained only by repeated inspection and examination.

The Physiology of Death by Electric Shock.—The report of Major Cardew on the fatality on the electric tramway between Portrush and the Giant's Causeway, to which reference is made in our "Electric Lighting Memoranda," necessarily causes one's attention to turn to the subject of death from electric shock; and therefore it may be justifiable to notice here some remarks in the *Electrical Review*, based on correspondence which has been going on in the *Lancet*. A theory has been put forward by Dr. Bleile that death is due to stoppage of the heart caused by the contraction of the large arteries. Sir G. Johnson disputes this conclusion, which, he says, is vitiated by the fact that these arteries do not contract owing to their nerve-centres being directly excited by the electric shock, because in this case they would be congested, and not empty as they are always found after death from this cause. Sir George considers that the condition of the body corresponds exactly with that found after death by asphyxia; and he thinks there is always hope of resuscitation except when the respiratory nerve-centre has been destroyed. This view agrees with that enunciated some time ago by M. d'Arsonval, who mentioned a case in which a workman was stunned by being subjected for a short time to a pressure of 4500 volts. About a quarter of an hour after the accident, assistance arrived, and artificial respiration was practised, with the result that in two hours the man was able to speak, and was eventually restored. Sir G. Johnson's conclusions appear to our electrical contemporary to be authoritative; and they emphasize the opinion they have frequently expressed that it may often be a means of saving life to remember that "a man struck by electricity should be treated as if drowned."

TECHNICAL RECORD.

MIDLAND ASSOCIATION OF GAS MANAGERS.

The Quarterly Meeting in Birmingham.

In the JOURNAL last week (p. 874), we published a general report of the proceedings at the above meeting, with the two papers read on that occasion. We now give the discussion on the short communication by Mr. W. T. Tew, of Warwick, entitled "An Incident in Purification."

The VICE-PRESIDENT (Mr. W. R. Cooper) said that Mr. Tew very properly stated, in the opening of his paper, that little matters often led to important results. Mr. Tew had been somewhat troubled; but he had relieved himself to his own satisfaction. If any gentleman had had similar experience, and would give the members the benefit of it, they would be much obliged.

Mr. W. W. HULSE (Longton) said he had had a somewhat similar experience to Mr. Tew. They used to find that the pipe at the bottom of the tar and liquor well became stopped up; and they had to periodically clear the tank out. He always noticed that the substance that stopped the pipe was of a greyish colour after it had been allowed to stand; and he came to the conclusion that it was carbonate of lime. They did not exhaust air through the lime; but the liquor condensing to the bottom of the purifiers used to be emptied into the tank. It was usually of a deep red colour, which was due to the presence of sulpho-carbonate of calcium. The lime in solution, as stated by Mr. Tew, on coming into contact with the ammoniacal liquor in the well, entered into combination with the carbonic acid present; forming carbonate of calcium, which was precipitated. In order to remedy it, they simply refrained from putting the liquor from the purifiers into the well; and they had adopted other means of disposing of it. It contained but very little ammonia; and one result of putting it into the well was to weaken the liquor. He did not find any benefit. He tested for ammonia, and found it was not worth consideration, and was, in fact, nothing more than spent lime in solution; so he thought it would be better to find another way of disposing of it, instead of passing it into the tar-well.

Mr. V. HUGHES (Tipton) remarked that Mr. Tew had said that he mixed a certain quantity of the liquor from his purifiers with a given quantity of ammoniacal liquor; and he (Mr. Hughes) would like to know what difference Mr. Tew found in the strength of the ammoniacal liquor after he had treated it in this fashion. From tests made some time ago, he thought he must find it considerably reduced.

Mr. B. W. SMITH (Smethwick) said he took it that the liquor, or rather the condensation from the purifiers, ran direct into the well, and that Mr. Tew did not collect it in a settling-tank as usual at the bottom of the purifiers, or any more convenient spot, and then allow it to overflow into the well. He presumed, in Mr. Tew's case, Warwick being a residential town, it was absolutely impossible for him to send the liquor into the river or sewers. He believed this was the cause of the trouble, which might have been obviated by emptying the boxes by means of a plug at the bottom of the purifiers, and then catching the liquor and throwing it on to the lime as it came out.

Mr. F. W. CROSS (Wellington) said the members must all be grateful to Mr. Tew for bringing a matter of this sort forward. But it was a subject they could not adequately discuss, as it was an experience practically new to a great many of them. The value of the paper lay in the fact that it would help them to steer clear of falling into the same error that Mr. Tew had done. He would withdraw the word "error," as it was more a matter of circumstance with Mr. Tew, who had been forced to get rid of the foul smell from the purifiers. He did it in the best manner possible, and got into this small hole in doing it, and in running his liquor away through his centre-valve. Although there was not room for much discussion on a paper of this sort, it was valuable to every gas manager; and they were indebted to Mr. Tew for having brought it forward.

The VICE-PRESIDENT said they all felt much obliged to Mr. Tew for having brought this matter before the Association. It was a thing that did not often occur in the experience of many of them. This stopping up of the pump suction in the tar-tanks was a nasty, troublesome job. Then they did not often get to the real cause of it; and the thing became an intolerable nuisance. He thought that, if Mr. Tew adopted the suggestion of Mr. Smith, and took the water away, instead of letting it go forward to the well with the other stuff, he would obviate the difficulty.

Mr. TEW, in reply, said he did not anticipate that the paper would provoke any discussion; as it was not calculated to do so. With respect to Mr. Hughes's question, he did not find any alteration in the strength of the ammoniacal liquor, for the reason that the change which took place was something like this: The carbonate of ammonia was changed to sulphide of ammonia; and only a small quantity being affected, no change was made in the strength of the liquor. Mr. Smith offered some kind remarks; and he (Mr. Tew) would like to explain to him how their purifiers were situated. They were so low as to be incapable of being drained. Hence the moisture from them went into the centre-valve in the ordinary way. But when condensation took place through the adoption of the steam-jet, they partially plugged the hole which communicated with the centre-valve, so as to allow the liquor to rest in the purifier; and then, as it would not drain away, it was pumped out. He also thanked Mr. Cross for his remarks. He should like to add that they used to allow the liquor condensed in the purifiers, when ventilating, to drain to the centre-valve; but they found that it soon blocked the valve with the deposition of solid matter, and so they allowed it to fall to the bottom of the purifiers, and then pumped it out. It might be thrown on the lime, but the nuisance from it would be considerable; and he thought that, by letting it go into the tar-well, all nuisance was avoided.

[We are compelled to hold over till next week a report of the discussion on Mr. Young's paper on "Prepayment Meters."]

AMERICAN GASLIGHT ASSOCIATION.

The Annual Meeting in Philadelphia.

The last number of the *American Gaslight Journal* to hand contains a general account, in the form of special editorial correspondence, of the Twenty-Third Annual Meeting of the above-named Association, which took place in Philadelphia on the 16th, 17th, and 18th ult., under the presidency of Mr. Walton Clark, of that city, whose Inaugural Address, noticed in our editorial columns, is given. The attendance of members and visitors was larger than on any previous occasion.

The proceedings were opened punctually at ten o'clock on the morning of the 16th; and the first business was the presentation of the Council's report, which showed that the number of active members had increased by 18, and of associates by 4. But, on the other hand, nearly as many had either resigned or dropped off the list. Some other routine business followed; and then came the Inaugural Address. An interesting feature in connection with a suggestion contained in it was the announcement by the President that one of the Past-Presidents, who did not wish to disclose his identity, had offered certain money prizes to be awarded for meritorious research. They were as follows: $100 for 1896, $200 for 1897, and $300 for 1898. Then came the reading and discussion of papers. The first was by Mr. W. H. Rogers, of Paterson (N.J.), on "The Creation of a Healthy Public Sentiment towards the Gas Company in the Locality in which it Operates." In the author's absence, it was read by the Secretary; and it gave rise to a good discussion. The next subject to claim attention was "Retort-House Design and Practice," which was introduced by Mr. A. E. Forstall, of Newark (N.J.). These matters occupied the members till the midday recess. Mr. Forstall had prepared an appendix to his paper; and this was taken up on re-assembling in the afternoon. Then came a paper by Mr. A. C. Humphreys, of New York, on "The Commercial Value of Photometry," the publication of which we commence to-day (p. 922). Next followed an illustrated lecture on "Acetylene," by Mr. W. W. Goodwin, which brought the day's proceedings to a close.

On the following morning, Mr. F. Egner, of Norfolk (Va.), started the business with an interesting paper on "The Storage of Oil at Gas-Works;" succeeded by one by Mr. E. G. Pratt, of Des Moines (Ohio), on "Bench Firing with Soft Coal." A paper by Mr. Irvin Butterworth, of Columbus (Ohio), on "The Ventilation of Gas-Lighted Rooms," completed the list of communications; and the "Question-Box" was opened with fruitful results. It was then agreed, on the recommendation of the Committee, to meet next year in St. Louis; and with the passing of the usual votes of thanks, the technical part of the business came to an end.

The following are the new office-bearers:—

President.—C. J. R. Humphreys, of Lawrence (Mass.).
First Vice-President.—Irvin Butterworth, of Columbus.
Second Vice-President.—C. H. Nettleton, of Birmingham.
Third Vice-President.—J. B. Crockett, of San Francisco.
Secretary and Treasurer.—A. B. Slater, jun., of Providence.

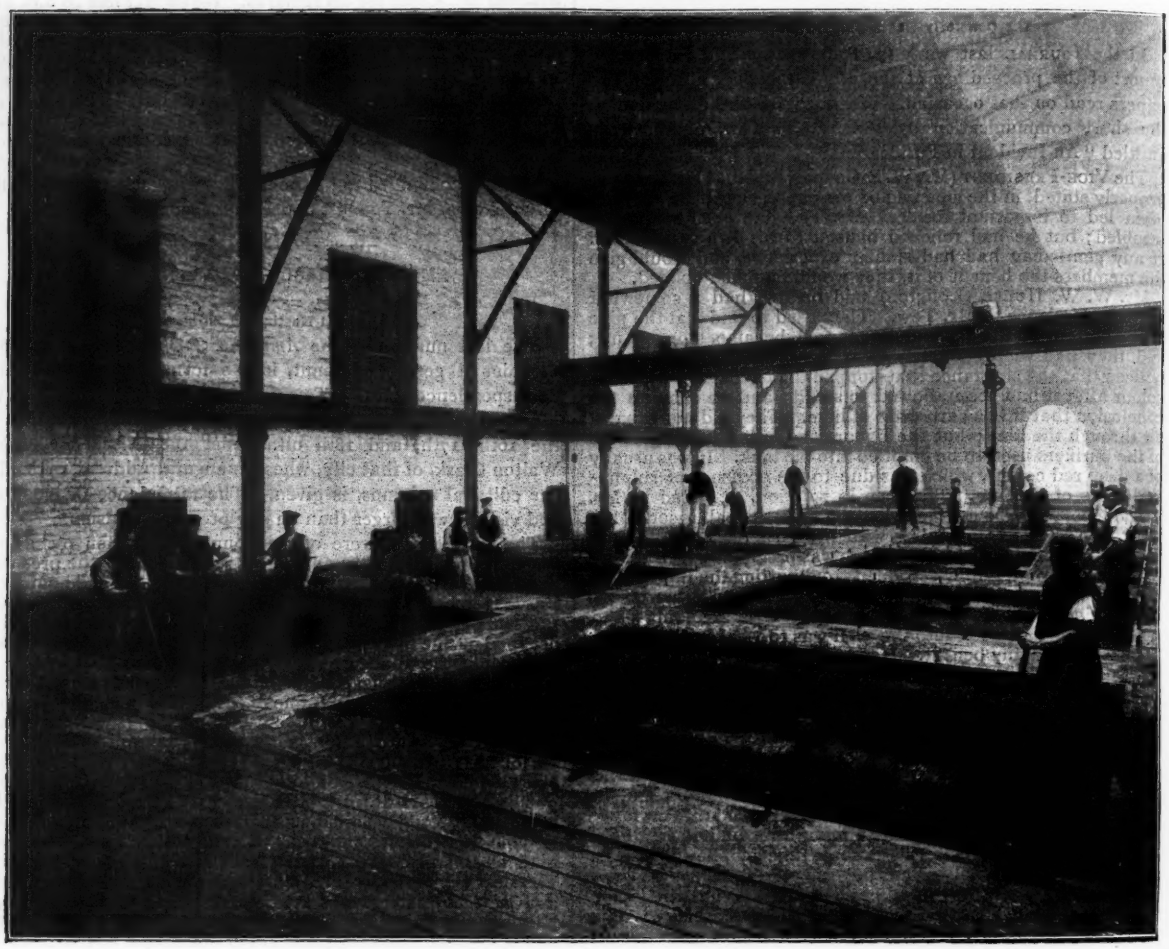
At the close of the second day's proceedings, the members visited the factories of the Welsbach Light Company at Gloucester City; a graceful acknowledgment of the presence of the ladies at the meeting being the presentation by the Company of a reading-lamp to each one. In the evening, there was a banquet. The third day was devoted to a trip to Atlantic City.

[Our usual abstract report of the technical portion of the proceedings at the meeting will be given in subsequent issues.]

Broken Fire-Bricks for Pavements.—The Engineer to the Commissioners of Sewers (Mr. D. J. Ross) has lately made a report on the existing experimental pavements in the City of London. In the course thereof, he mentions a pavement formed principally of broken fire-bricks, retorts from gas-works, crushed boulders from the seashore, a certain quantity of broken Portland, Robin Hood, and Bath stones, mixed with Portland cement, cast in a mould, and laid in slabs. This pavement was put down on the south side of Liverpool Street, next to Bishopsgate Street, in 1888; and it is now in good condition.

THE PURIFIER-HOUSE AT THE PRESTON GAS-WORKS.

(*For Description, see p.* 918)



THE COMMERCIAL VALUE OF PHOTOMETRY.

At the recent Annual Meeting of the American Gaslight Association, a brief notice of which appears in another column, Mr. A. C. HUMPHREYS read an interesting paper on the above subject, the principal portions of which are given below.

In the course of his introductory remarks, the author acknowledged that much has of late been written on photometry, and that it has been of a most conflicting character. He said he was also aware that the subject was one which could be better handled by a physicist than by a practical gas engineer. At the same time, in accepting the task of writing a paper, he hoped his efforts might result at least in shedding light on some of the dark corners, and in perhaps inciting more competent minds to take up the work and satisfactorily carry it through. He then briefly described the plan of his paper. He said he should first discuss the subject of illumination and photometry in general, and notice more or less specifically the points tending to show disagreement between candle power, illuminating power, and illuminating effect, and afterwards try to indicate which are the safer paths to be followed in photometrical work. He then proceeded to deal with his subject at length.

Illumination and Photometry.

It will be remembered by many of those now present that ten years and more ago, when the contest between the coal-gas and the water-gas advocates was at its height, the question was raised as to the relative illuminating values of coal-gas and water-gas flames of the same candle power. The claim was made that a "good" 16-candle coal-gas flame would give as much illumination as a 20-candle water-gas flame. Again, the rivalry between gas and electric light interests brought up this question; and the photometer has at times been discredited by gas men when the figures seemed to tell in favour of electric light. And now, again, our friends in Great Britain have taken up the discussion; and, as with us, we find this question tacked on to another over which a contest is being waged—namely, the question of high *versus* low candle power gas.

In Great Britain, therefore, and in America, in both the cases above cited, these most fundamental and important questions of candle power, illumination, and photometry have been tacked on to questions necessarily partisan in their character. This is to be deplored, for the questions are sufficiently complex to merit most thoughtful and unprejudiced consideration. It only remains for those of us who may have reason to be prejudiced to be still more on our guard against this influence.

The first difficulty confronting us in this, as in all such discussions, is ambiguity of expression. But this is particularly a difficulty in this case, for the reason that we are not agreed upon a nomenclature to be employed. Not only are we not agreed as to the names for the units and quantities involved, but we are not agreed as to the functions involved in those units and quantities. For instance, how loosely do we employ the word "intensity," without specifying whether we have reference to the light-source or to the light-waves from that source, or to the illuminated surface.

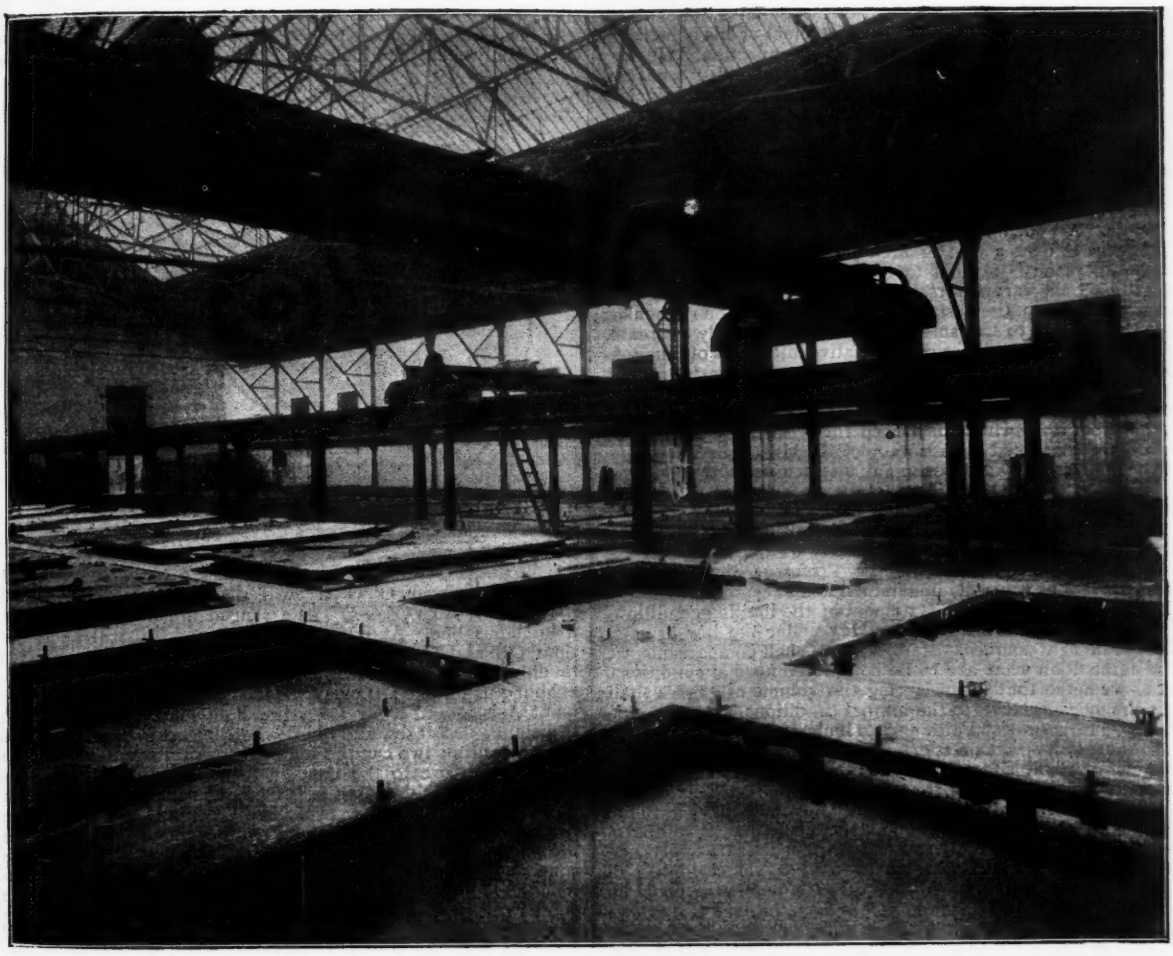
M. Blondel has proposed a scheme of units, and a system of nomenclature in connection therewith; though I fear that the scheme is too elaborate for adoption by gas engineers. But at least we can make the proper distinctions between the various functions involved, and express ourselves accordingly. Let us, first of all, carefully distinguish between intensity of the luminous source and intensity of illumination. One refers to the cause, and the other to the effect. It is true that we measure the cause by the effect; but it is none the less necessary to keep the distinction clearly in mind, if we would avoid entanglement in our discussions.

We must also bear in mind the distinction between candle power and intensity of illumination. A 25-candle power light is of 25-candle power, whether measured at a distance of 1 foot or of 4 feet. But the intensity of illumination in the first case is sixteen times as great as in the second case. We must also agree as to the meaning of quantity of light and quantity of illumination. For instance, if we have a light-source of finite dimensions (as all our light sources are), and we can say it is giving a certain luminous effect for unity area of surface, the quantity of light emitted will be this intensity multiplied by the area of the source.

If this light is received upon an enveloping hollow sphere, the total illumination will be the illumination per unit of surface (namely, the intensity of illumination) multiplied by the area of the sphere's surface. The quantity of light emitted will be the same as the quantity received by the inner surface of the sphere, provided the sphere is filled with an absolutely transparent medium; and the quantity of illumination will be the same,

THE PURIFIER-HOUSE AT THE PRESTON GAS-WORKS.

(*For Description, see p.* 918.)



irrespective of the size of the sphere. But the intensity of illumination will vary inversely with the size of the sphere.

It might seem as if, to be strictly accurate, we should, when calculating quantity of light, also include the function of time, as we would in the case of the flow of gas or water. While light does not flow, it has a duration of effect; and if by intermittent action the effect upon the retina were the same as if the light-effect were constant, then, in valuing light by its effect upon the retina, in considering and comparing quantities, we should have to bring into our calculations the net time of light-emission. An intermittent light-source would have economical advantage by reason of the periods of rest. But while there is such a persistence of visual impression upon the retina, such an intermittent light-source is not to be permitted on hygienic grounds; and we may dismiss time as a practical function.

Often, in connection with the comparison of lights, we find the statement made that one light has intensity, while the other has quantity or value. Both have intensity, high or low; and both have quantity, large or small. If the two light-sources emit the same quantity of light, but have unequal intensities, then they have areas inversely proportional to their luminous intensities. It may be difficult, and even impossible, to directly measure their luminous intensities and the light-giving areas; but this relation must of necessity exist. But we can measure the relative light-giving effects by studying the relative intensities of illumination produced; and so measuring, we find that smaller areas of manifestly higher luminous intensities give the same intensity of illumination as larger areas of manifestly lower luminous intensity.

Illumination is an effect produced upon the retina of the eye. The eye cannot, simply by observation, form a correct judgment as to intensity of illumination. But by direct comparison between two illuminated surfaces, it can detect if one is more brilliantly illuminated than the other; though even then it cannot correctly estimate their relative intensities of illumination. By gradually increasing the illumination of one or decreasing that of the other surface, the eye can, with a narrow limit of error, decide when the two surfaces have been brought to the same degree of illumination. With a Rumford photometer, this difference need not be more than 1-64th. Under proper, but readily attainable, conditions, with fairly normal eyes, this difference need not exceed 1-100th, or 1 per cent.; by some physicists it has been reduced nearly to 1-200th.

In our photometrical work we are governed by two laws, which are generally stated thus: (1) The intensity of illumination on a given surface is inversely as the square of the distance from the source of light. (2) The intensity of illumination which is received obliquely is proportional to the cosine of the angle which the luminous rays make with the normal to the illuminated surface. These two laws could be combined in one statement: The intensity of illumination on a given surface is inversely as the square of the distance from the source of light, and directly as the cosine of the angle of incidence.

With the bar photometer, we are supposed to compare lights the rays of which are normal to the surface, which is the disc. Then the angle of incidence is zero, and the cosine 1; and so the second law can be neglected.

Referring to the first law, assume a light-source at O, fig. 1, placed at the centre of the concentric spheres A B C, A′ B′ C′, and A″ B″ C″. The total quantity of light emitted from the point O will be intercepted by the internal surface of the sphere A B C. If the sphere A B C be removed, the same quantity of light will be spread over the surface of A′ B′ C′. And if A′ B′ C′ be in turn removed, the same quantity of light will be spread

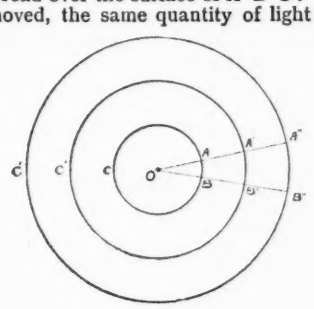


FIG. 1.

over the sphere A″ B″ C″. The quantity of light remaining the same, the intensity of illumination necessarily varies inversely with the areas of the spheres illuminated; and these areas will vary with the squares of the radii. Hence the intensity of illumination varies inversely as the squares of the distances. What is true of the spheres will be true of their

proportionate parts, as, for instance, the parts cut out by the cone A″ O B″.

The accuracy of this law, as applied to practical conditions, has been frequently disputed of late years; and as Mr. Chollar, in his paper "The Rule of the Inverse Squares," has been more than ordinarily definite in the statement of his objections, I will take his utterances as a text in this connection. He says the law as stated is not, as is sometimes supposed, "a natural law of light," but simply depends upon the geometrical principle that the surfaces of spheres are directly as the squares of their diameters. It is true that the law is based upon this principle. It is likewise true that the demonstrations offered are usually mathematical; also that scientists have for years demonstrated by experiment that the law holds good in practice.

The second, or cosine, law is also based upon a mathematical principle. A pencil of light meeting an oblique plane surface will be spread over a greater area than if meeting a surface of which the plane is normal to the rays. Mathematically, the intensity should vary inversely with the increase of area. As the area increases, the cosine of the angle which the ray makes with the normal to the surface will proportionately decrease, and therefore be a measure of the relative intensities of illumination. But in this case, applying experimental tests, it was found that the law was not strictly accurate, as the reflection increased with the angle. Thus we see that the scientific work of the laboratory which disproved the strict accuracy of the cosine law, confirmed the accuracy of the law of distances.

Mr. Chollar quotes Professor Tait's statement of the first law, and appears to be satisfied as to the accuracy of the law as thus stated—viz., "If the medium be *transparent*, the intensity of illumination which a luminous point can produce on a *white* surface *directly exposed* to it is inversely as the square of the distance." (The italics are mine.) Professor Tait here only states the law as generally understood and accepted.

Let us see if the specific statement of the limiting conditions in any way prevents us from working under the law in comparisons of light-sources. Manifestly, in such comparisons, we must agree upon what are to be considered normal conditions, just as we agree that in measuring the volume of gas we shall refer the measurements to the normal conditions, as to temperature and pressure—60° Fahr. and 30 inches barometer.

We must first assume a transparent medium. Otherwise the same light would show differing lighting values according to the medium present, and the same medium would differently affect the light from different sources. A little thought as to the passage of light from the stars will convince us that, in comparative tests, it is not difficult to meet the condition as to transparency of medium. Light moves with a velocity (say) of 180,000 miles per second. At this velocity, our earth could be encircled 7½ times in a second. Light from the fixed stars takes years to reach us; and yet it is then able to produce light-sensation on the retina. Can we not assume then, for all practical purposes, that the ordinary transparency of our atmosphere is sufficient to meet this imposed condition?

We next come to the limitation that the light-source must be a luminous point. Mr. Chollar evidently regards this limitation as a complete bar to the application of the law in the case of light-sources of finite dimensions. To demonstrate his proposition, he assumes a line as the light-source, and then shows rays from a certain number of points in the line, converging to, and intersecting at, a point taken outside of the line. Then he says: "Now, since light moves in straight lines, all rays starting from A D (the luminous line) in the direction of E (the point taken outside) must remain within the limits of the triangle A E D. Sections *e e* of A E D, therefore, parallel with A D, will represent aggregates of light-waves or quantities of light equal to each other, and equal to the total quantity emitted at A D."

He then goes on to say: "It appears, therefore, that, irrespective of intensity, the quantity of light from a luminous body at any particular point is independent of the distance of the body, and is in direct proportion to its diameter. If the above reasoning is correct, the total energy exerted by a light is represented by the product of two factors, one of which being increased, the other can be correspondingly reduced. The rule governing the value of lights, therefore, would be something like this: The light from a luminous body is inversely as the square of its distance, and directly as its projected area." It seems to me that Mr. Chollar is here confusing cause and effect. We measure the value of a light-source by its illuminating effect; and the law is so given even in the form approved by Mr. Chollar.

Suppose we have three points, O′ O O″ (fig. 1A) of equal luminous intensity, then, according to Mr. Chollar, there will be concentration of rays within the angle O′ A O″; and this will be true of all points outside of O′ O O″, except along the projection of the line O′ O″. This concentration is expected to compensate in part for the decrease of illuminating effect due to increase of distance.

But what is true of any one point, as O, is true of all points, and therefore of O′ O″. The light-rays will, therefore, diverge equally from the points O′ O O″, and will spread themselves equally over their enclosing spheres; and the resulting intensity of illumination in each case will be inversely as the squares of the radii. The intensity of illumination at A will be the combined intensity produced by the rays OA, O′A, O″A. Now suppose the luminous points O′ O O″ were compressed into one luminous point at O, resulting in one point of a luminous intensity equal to the combined intensities of O′ O O″—that is, equal to three times the luminous intensity of O. Then we shall have the light emitted uniformly, and uniformly illuminating the inside surface of the sphere A B C, and therefore following the law of the inverse squares. But in moving O′ and O″ into O, the only change we have made with regard to A is to shorten

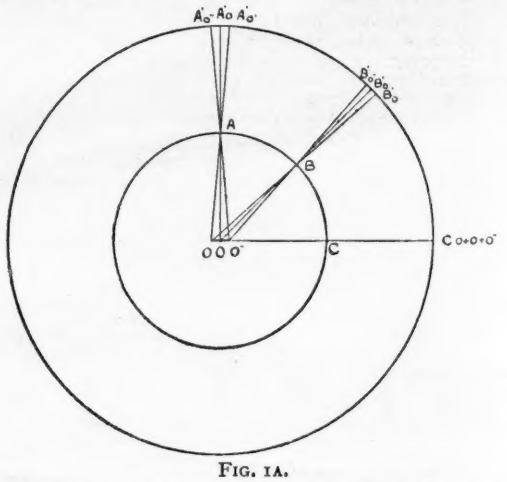


FIG. 1A.

the distances O′A and O″A; and to that extent the combined illumination from O′ O O″ will differ from the combined illumination from O′ O O″, as arranged in fig. 1A to represent a luminous line. At B and at C, O′B and O′C will be longer than OB and OC, and O″B and O″C will be shorter; thus tending towards compensation, and, within working limits, enabling us to take OB or OC as the average distance. As the point A is moved away from the light-source, the difference in distance decreases, and quickly becomes negligible. This we see when using two candles for a photometer standard. If the disc is very close to the candles, inequality of illumination is apparent, and the reading fails to check with the reading from one candle multiplied by two. But moving the disc away, we get a uniform illumination, and a reading which will check with the single-candle reading. As far as the law of the inverse squares is concerned, it makes no difference whether the illuminated surface at A gets its concentration of rays from one point or three, except the minor discrepancy due to difference in distances just referred to. Here I refer to effect. But if from the one point we are to obtain at A the same illuminating intensity as from three points of equal intensity, the one point must have three times that luminous intensity. Here I refer to cause.

Mr. Chollar says: "The *light* from a luminous body is inversely as the square of its distance, and directly as its projected area." The *light* from a luminous body will always remain the same, irrespective of distance, until it is absorbed by some opaque body. The intensity of illumination from a luminous body will vary inversely as the square of its distance. The light from a luminous body will be directly as its area (not its projected area), provided the light-source is transparent to its own rays and its luminous intensity is uniform over its entire area.

We come now to the condition that the illuminated surface must be white. No one familiar with photometry will object to this condition. In fact, it is always stipulated that the screen or disc should be white. Any deviation in this regard would be sure to work injustice to one of the lights compared, on account of the composite nature of all light. In practical illumination, the light will meet surfaces possessing all possible combinations as to absorption and reflection, and giving the consequent variety of colour effects. We cannot expect to compose light to suit this infinite variety of conditions; and we must therefore use a surface which will reflect all colours of the spectrum.

The last condition is that the surface shall be directly exposed to the light. This is necessary for the reasons just given. If the light were allowed to first fall on other surfaces, and we attempted to compare the diffused light from each source, we should be again met with the point that the light from one source will be absorbed to a greater or less degree, depending upon the surfaces and the composite nature of the lights.

I hope I have shown that, in accepting Professor Tait's careful statement of the law of the inverse squares, we do not have to abandon our belief in the previously accepted principles of photometry.

(To be continued.)

Russian Petroleum Exports.—According to a statement issued by the Finance Ministry of Russia, the exports of petroleum from that country to European countries in 1894 amounted to 24,923,840 poods, of which 5,959,032 poods came to England. Turkey took 236,000 poods more, and Austria 454,007 poods more than this country.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Street Lighting with "Welsbach" Incandescent Burners.

SIR,—Your contributor "Veritas" is mistaken, when, in your issue of the 29th of October (p. 873), he states that, in your previous article on the above subject, of the 27th of August, I condemn the "usual bye-pass arrangement." What I disapprove of is the chain and ring attachment to the tap lever; and I certainly think that the ordinary T tap, which is fixed outside and beneath the lantern in the usual way, and which is now being supplied by the Incandescent Gas-Light Company, is very much to be preferred.

Instead of condemning the bye-pass itself, the more experience I have with these burners, the more convinced am I that, not only for public, but for satisfaction and economy in most forms of domestic lighting, they are indispensable.

H. H. JONES.

Isle of Thanet Gas Company, Margate,
Nov. 1, 1895.

The Limit of Time for Proceeding against Offenders.

SIR,—I shall be glad if you will allow me to state the following facts, and invite your opinion, and those of your readers, on the question of the liabilitiy to prosecution of a workman who becomes the instrument of a defendant found guilty and fined.

At the Aberdare Police Court, on Tuesday last, the local Gas Company sued a consumer of gas at a public-house for having, through his private gas-fitter, whose name and address he gave, inserted a bye-pass pipe from the inlet to the outlet of his meter, through which pipe gas had been fraudulently abstracted, unregistered, for about three years; gas being also passed at the same time through the meter, and registered in the usual way. The defendant admitted the offence, and was fined the maximum penalty of £5, to be paid to the Company, and costs; and £30, also to be paid to the Company, the estimated value of the unregistered gas abstracted through the surreptitious pipe.* The gas-fitter who fixed the pipe had been summoned to give evidence at the trial; but he failed to attend.

It is generally felt that this fitter was as much to blame, morally, as his employer (the defendant); but we are given to understand that, as he committed the offence at a date prior to six months ago, he cannot now be proceeded against; in other words, that an offence of this class is not actionable after the expiration of six months from its commission. Would not the law mean six months after the misdeed had become *known?* It was committed three years ago; but the fact was not known to the Gas Company until recently.

EVAN JONES,
Secretary and Manager, Aberdare Gas Company.

Aberdare, Oct. 31, 1895.

The Alcester Gaslight, Coal, and Coke Company, Limited, has been registered, with a capital of £2760, in 24 ordinary shares of £100 each, and 72 preference shares of £5 each, as the incorporation, under the Companies' Acts, of the Alcester Gaslight, Coal, and Coke Company, constituted by deed of co-partnership and deed of declaration, dated respectively Jan. 1, 1850, and July 9, 1851. All the shares were subscribed for on Oct. 16, 1895; and the full amount called and paid in respect thereof.

Prepayment Meters at Rotherham.—Complaints having been made at Rotherham as to the delay of the Corporation Gas Department in supplying prepayment meters, Mr. G. Gummer, at a meeting of the Town Council last Wednesday, asked the inhabitants to exercise a little patience in this matter. They had, he explained, 27 men engaged fixing the automatic meters at the rate of 54 per week; and they would very soon be able to meet the demand. They had already fixed 650 meters, and had applications for 295 more; so that by Christmas they would have about 1000 consumers more than they had previous to the introduction of this class of meter.

Additional Works for the Newcastle and Gateshead Gas Company.—The officials of the Newcastle and Gateshead Gas Company have been engaged for some time past in surveying land at Walker for the purpose of constructing new works, to enable them to supply the inhabitants of the now fast-growing district at the east-end of Newcastle. The land in question is about 80 acres in extent—the greater portion being on Lord Northbourne's estate, while the remainder is leasehold, and belongs to the Newcastle Corporation. The North-Eastern Railway Company's riverside line runs almost through the middle of the land; and a good river frontage is available.

Sales of Shares.—Last Tuesday, Mr. W. Emery sold by auction, at Guildford, 51 shares in the *Guildford Gas Company.* Nine £25 "A" shares (10 per cent.) fetched £62 10s. each; and three do., £63 10s. each. Eight £10 "D" shares (7½ per cent.) were knocked down at £19 apiece; and other shares of similar nominal value, but entitled to 7 per cent. dividend, realized £18 each.——Messrs. Cumberland and Hopkins, of Leighton Buzzard, have lately sold two lots of original (£21) stock in the *Leighton Buzzard Gas Company* for £49 each; also £1000 of new ordinary stock, in £50 lots, at prices ranging from £75 to £81 per lot.——Among some miscellaneous stock and shares sold at Leeds by Messrs. Hollis and Webb last Tuesday, was £200 of 7 per cent. *Calverley and Horsforth District Gas Company's* stock, which realized £347.——The sale by auction of the £15,000 of new ordinary stock in the *Wolverhampton Gas Company* which was recently advertised in the JOURNAL, resulted in an average price of £126 12s. 6d. per cent. The highest figure obtained was £131 10s.; the lowest, £124. The standard dividend authorized by the Company's Act of 1893 on this stock is 6 per cent., subject to the usual sliding-scale clauses.——Last Tuesday, £2500 of 7 per cent. stock in the *Lewes Gas Company* was sold for £3887. The prices ranged from £154 to £157 per cent.——Shares in the *Camborne Gas Company* were sold locally on Wednesday at £5 1s. 6d. and £5 2s.

* A report of the case is given in our "Legal Intelligence."—ED. J.G.L.

LEGAL INTELLIGENCE.

LIVERPOOL CITY SESSIONS.—Tuesday, Oct. 29.

(*Before Mr.* C. H. HOPWOOD, Q.C., *Recorder.*)

Appointment of an Auditor of the Gas Company's Accounts.

Three several applications were made to the Court to-day for the appointment of an Auditor of the Liverpool United Gaslight Company's accounts: (1) By two large trading firms in the city, who desired the appointment of Mr. William C. Spencer, the President of the Liverpool Society of Chartered Accountants; (2) by two other firms, who wished Mr. P. B. M'Quie to be re-appointed; and (3) by the Corporation and Aldermen Frederick Smith and Rathbone, who suggested the appointment of the Corporation Auditor, Mr. Richard Barrow.

Mr. HORRIDGE, who appeared in support of the first proposal, quoted the section of the Gas-Works Clauses Act under which, on the petition of two ratepayers who were not proprietors in the Company, the Recorder could appoint an Auditor to examine and ascertain the actual state and condition of the concerns of the Company. Mr. Spencer, whose nomination he supported, was President of the Liverpool Society of Chartered Accountants, a member of the firm of Banner, Spencer, and Co., and a Public Accountant of some twenty years' standing. He (Mr. Horridge) ventured to submit that it was never intended that the Corporation should be the party to check the accounts of the Company. Had that been the case, the Act would have expressly stated it. As for Mr. M'Quie, he now had no office in Liverpool as a Chartered Accountant, and he resided at West Kirby.

Mr. TOBIN, supporting the second petition, pointed out that for nineteen years—from 1874 to 1892—Mr. M'Quie had been the Auditor appointed to examine into the accounts of the Company; and he therefore had a ripe experience for the audit, which he again sought. When he was superseded in 1892 by Mr. Barrow, suggestions were, he believed, made that Mr. M'Quie's reports were too favourable to the Company, and that if Mr. Barrow were appointed by the Court, certain irregularities which had been overlooked by Mr. M'Quie would be found out by Mr. Barrow.

Mr. SEGAR (who appeared for the Company) said there was no suggestion made that Mr. M'Quie's accounts were wrong.

Mr. TOBIN said he never suggested that. As a matter of fact, Mr. Barrow had found nothing wrong in the Company's accounts; and he had simply followed the lines of Mr. M'Quie's reports, which were always most comprehensive. He asked his Honour, with confidence, to reinstate Mr. M'Quie.

Mr. COLLINGWOOD HOPE, for the Corporation, said that Mr. Barrow's appointment had been assented to by the Company. No objection whatever had been urged against him; and so far as he (Mr. Hope) knew, no suggestion was made against him now. The idea that, because there was some rivalry between the Company and the Corporation, no person interested in the Corporation ought to be appointed, was altogether wide of the mark. He respectfully urged there was no reason for such a suggestion, and said there had never been any complaint of Mr. Barrow showing any want of impartiality. He need hardly point out that at the present time the Corporation were not in the position of rival gas makers. A proposal stood on the books; but he understood nothing had been done about it, and nothing was intended to be done.

Mr. SEGAR said this was the first time they had ever opposed the appointment of any Accountant. They had always left it entirely to the discretion of the Court, and had taken no part in the proceedings, either in assenting to or opposing any nomination. They did not in any way suggest that Mr. Barrow was incompetent or failing in impartiality. He had made two reports, which showed distinctly that he was a competent man, and also that there was absolutely nothing from the beginning to the end of the Company's concern of which they need feel ashamed or desire to conceal. Now, however, the circumstances between the Company and the Corporation were altered. The Corporation proposed to obtain an Act of Parliament to take away the business of the Company; and therefore they were interested in getting to know as much about the business of the Company as they could. It was quite contrary to the ordinary principles of mercantile transactions that one business should have the opportunity of inquiring into the management of another business upon matters which were vital to the existence of one or both. Notwithstanding the tumult of abuse which had been showered upon the Company, they could always hold up their heads; and there was not a single act that had ever been done which any person could lay hold of. Everything had been raked up from the very bottom; and nothing had been discovered against the Company. He (Mr. Segar) submitted that it was quite clear the Recorder had no power to appoint a rival proprietor of gas-works to examine their accounts. At present the Corporation were competitors in the production of artificial light in Liverpool. They were already the proprietors of the Electric Supply Company, and were, therefore, practically in the position of a rival company.

Mr. HOPE: The Electric Supply Company have not yet been taken over.

Mr. SEGAR said it was going to be taken over; and, moreover, the Corporation had on their books a resolution (which surely was not a sham resolution) to start gas-works of their own. It was almost impudent of the Corporation—if a corporation could be impudent—to ask that their official should be appointed Auditor, seeing that they were now at "daggers drawn" with the Company. The Company objected to the Corporation interfering any further with their business; and they contended that it would be contrary to the spirit if not the letter of the Act of Parliament if Mr. Barrow were appointed. They did not object to Mr. Spencer, Mr. M'Quie, or anybody else; but they did not want the Corporation meddling with them any longer.

The RECORDER, in giving his decision, said he had no doubt that Mr. M'Quie performed his duties as Auditor very thoroughly; but there were reasons on the previous occasion, on which he had to base his decision in favour of Mr. Barrow, that again led him to the conclusion that he could not appoint Mr. M'Quie. The Corporation, with praiseworthy motives, were taking up this matter; and if the Gas Company

had acted fully up to their statements, and honourably by the public, they could not complain that the Corporation should desire to investigate matters to the utmost, and procure better terms, if possible, for those whom it was their duty to protect. It was clear to him (the Recorder) that a dispute had arisen between the Company and the Corporation; and he felt he would best comply with the spirit of the Act of Parliament if he secured the services of an unimpeachable nominee, who, while doing justice to the Company, would also watch over the interests of the community. He therefore accepted the nomination of Mr. W. C. Spencer.

HERTFORD COUNTY SESSIONS.—Saturday, Oct. 19.

(*Before Mr.* A. G. PAGE, *the Mayor of Hertford, Chairman, and a Bench of Magistrates.*)

Baker v. Hertford Gas Company—The Making Up and Supply of Annual Accounts.

As briefly recorded in the JOURNAL last week, the Hertford Gas Company were summoned before the Justices on the above-named day, on two informations laid against them by Mr. Alfred Baker, the ex-Mayor, under the Gas-Works Clauses Act, 1871. In the first case, the complaint was that the Company had failed to "fill up and forward to the Corporation of the Borough of Hertford (being the local authority of the district within the limits of the Hertford Gas Act, 1864), on or before the 25th day of March, 1895, an annual statement of the accounts of the said Company, made up to the 31st day of December, 1894, in the form and containing the particulars specified in Schedule B of the Gas-Works Clauses Act, 1871 (34 & 35 Vict., cap. 41);" in the second, that they "unlawfully did not keep and sell to Alfred Baker, who then applied for the same at the office of the said Company . . . copies of their annual statements of account made up to the 31st day of December in the years 1890, 1891, 1892, 1893, and 1894 respectively," as provided by the Act.

Mr. R. ELLIOTT appeared for complainant; Mr. C. E. LONGMORE represented the Company.

Mr. LONGMORE raised a preliminary objection to the second summons, on the ground that it contained no less than five separate offences. He said the Summary Jurisdiction Act of 1848, sec. 10, contained a provision that "every complaint shall be for one matter of complaint only, and not for two or more matters of complaint; and every information shall be for one offence only, and not for two or more offences." He submitted that, if an offence had been committed at all, it had been committed in regard to each separate year, for all of which offences it was open to Mr. Baker to institute proceedings; and therefore the one summons taken out included no fewer than five separate cases. But for a certain course which it would be competent for his friend to take, his objection was absolutely fatal to the summons as it stood at present. He cited a case in support of his contention; and, upon the authority thereof, he asked the Magistrates either to dismiss the summons, or ask his friend to elect which of the five years he proposed to go upon.

Mr. ELLIOTT said, of course, he could not complain that Mr. Longmore should make this formal objection. While not admitting that five offences had been committed, on the ground that application for the whole of the balance-sheets was made at one time, he was content to take only the year 1893. It made no difference as regarded this particular class of offence; and if the defendants were guilty for one year, he was quite satisfied.

The summons having been amended by striking out the years 1890, 1891, 1892, and 1894,

Mr. ELLIOTT proceeded to open the case. He said this was a prosecution instituted under the 35th section of the Gas-Works Clauses Act, 1871. The section provided that the undertakers (in this case the Hertford Gas Company) should forward to the local authority of their district, on or before the 25th of March of every year, an annual statement of account made up to the 31st of December next preceding, in the form laid down by the Act; and also that they should keep copies of the same for sale at a price not exceeding 1s. each. It further provided that a penalty of 40s. would be incurred for each day during which default was made. The position of the Hertford Gas Company, and similar companies, with reference to their accounts, was shortly as follows: Under the Gas-Works Clauses Act, 1847, all companies were required to deposit copies of their annual accounts with the Clerk of the Peace for the county in which their works were situate, before the 31st of January in each year; the copy so sent to be open to any person on payment of 1s. for each inspection. In 1864, the Hertford Gas Company were formed; and their Act of Parliament received the Royal Assent on the 23rd of June of that year. In this Act, the Gas-Works Clauses Act, 1847, was incorporated, together with other Acts of Parliament. The Hertford Gas Act, he wished to impress upon the Bench, did not contain any provision relating specially to the statement of accounts. It was most important that this should be borne in mind, because there were numerous gas companies throughout the country who were placed in a different position, in regard to their accounts, to the Hertford Company; for in their Private Acts they had special clauses affecting their statements of account, both as regarded the form in which they were kept, and the date when they should be presented. Numerous decisions which had been given proved that, in the case of companies having these special clauses, they were exempt from the operation of the Act of 1847; and they therefore stood in a different position from the Hertford Company. He did not know whether or not the Company had carried on their affairs, so far as the presentation of accounts was concerned, under the impression that they did not come within the provisions of the Act of 1847, and were in the same position as those companies who, by reason of special clauses in their own Acts, were exempt. He did not, however, for a moment suppose that Mr. Longmore would contend that there was anything in the Hertford Gas Act exempting him from the provisions of the 1847 Act. Section 49 of that Act provided that nothing contained in a Private Act should be deemed to exempt the undertakers from any General Act relating to gas-works, &c., even though the Private Act was passed in the same or in a future session of Parliament. In 1871, another Gas-Works Clauses Act was passed; and its first section provided that the Act of 1847 and that Act should be construed together as one Act, and that the provisions of the Act of 1871 should be held to repeal and supersede such of the provisions of the Act of 1847 as were inconsistent with it. Therefore they must take the Acts of 1847 and 1871 and read them together; and wherever the provisions of the former Act were inconsistent with those of the Act of 1871, they must take the latter as prevailing in the matter. The third section of the Act of 1871 specified that the Act should apply to every gas undertaking authorized by any Special Act passed or Provisional Order granted under the authority of the Gas and Water Works Facilities Act, 1870, save where provision was expressly made for exempting the undertakers from it. In the absence of any special provision in the Hertford Gas Act exempting the Company from the Acts of 1847 or 1871, their position was this—that, so far as their accounts were concerned, they were regulated by the Act of 1871. The 35th section of this Act provided that the accounts should be made up to the 31st of December, and copies of the balance-sheet deposited with the local authorities by the 25th of March next following, and other copies kept for sale. That was the section of the Act which governed the affairs of the Hertford Gas Company, because there was no special clause in their own Private Act exempting them from it. The accounts of the Company had, he should prove, been made up, not in March, having relation to the previous year ended the 31st of December, but in June; and therefore the Company had not complied in any sense with the terms of the section. Though it might be urged by Mr. Longmore that no very grievous wrong had been committed by a mere matter of three months or so, he was sure the Magistrates, in deciding the case, would agree that it was no question for them to determine why the Legislature had fixed the date they had. It was sufficient for their purpose that Parliament had laid it down as law that the accounts were to be presented on or before the 25th of March, having relation to the previous December. Mr. Baker would no doubt be able to furnish good reasons why he laid complaint in this matter; but it was sufficient for him (Mr. Elliott) to prove that the Company had rendered themselves liable under the section, and to ask the Bench to inflict upon them such a penalty as they thought proper to meet the offence they had committed. He was not without precedent in this matter; and he would call attention to the well-known case of *The Dudley Gas Company v. Warmington*,* which was on all-fours with the present one. In that case, the Dudley Gas Company, in the year 1880 and previous years, did not comply with the section providing that they should keep copies of their balance-sheet for sale. There the information was laid by the Town Clerk; and a fine of £50 was imposed. The Dudley Company were incorporated by Special Act passed in 1853. There was nothing in that Act which exempted them from the operation of the General Act of 1847; and they were therefore in exactly the same position as the Hertford Company. They appeared to have been under the impression —very much the same as he thought the Hertford Company had been —that they did not come under section 35 of the Act of 1871; and therefore they did not keep their accounts in the way prescribed by that Act. The Company appealed against the decision of the Justices; and the Judges in the High Court upheld the Magistrates' decision. Having indicated the legal position he took with regard to this matter, it was only fair that he should show how the Company had been approached by Mr. Baker. It appeared that the proceedings commenced by a letter, written by him on the 3rd of September last, addressed to the Secretary of the Company, in which he requested him to supply him with copies of the annual statements of account for the years ending Dec. 31, 1890, 1891, 1892, 1893, and 1894, for which he enclosed the prescribed fee—5s. To this the Secretary replied by sending the balance-sheets made up to June 30 in each year. Mr. Baker then wrote back returning the balance-sheets, and stating that he had applied for the accounts made up to Dec. 31, and not to June 30 as sent, in accordance with the provisions of the Gas-Works Clauses Act, 1871; and asking for the proper accounts by bearer. To this letter the Secretary wrote stating that the accounts of the Company were made up to June 30 in each year, and pointing out that the printed balance-sheets sent covered the periods asked for. Mr. Elliott was about to read another letter, when

Mr. LONGMORE objected, on the ground that it was an attempt to discuss the accounts of the Company.

Mr. ELLIOTT submitted that the Company had answered it; and therefore he thought he might read it.

Mr. LONGMORE said the question before the Bench, as Mr. Elliott had very fairly put it up to that time, was whether the accounts were made up to the 31st of December and delivered. He submitted that the Court had no power to go into the question of those accounts.

Mr. ELLIOTT said he did not for one moment wish the Bench to do so.

The MAYOR: That being so, the letter spoken to will not be read.

Mr. ELLIOTT, continuing his opening statement, said he was reading a letter dated the 6th of September, in which Mr. Baker said he had before him the Company's financial statement for the year ending June 30, 1895; and he found the following discrepancy upon comparing it with the accounts for the previous year, which, in the interests of the shareholders, required explanation. In the first case, the revenue account showed that the Company had received——

The MAYOR: I do not think this can be admitted; it has nothing to do with the case. You have already shown that Mr. Baker applied for balance-sheets. It is the opinion of the Bench that this letter should not be admitted.

Mr. ELLIOTT said they might take it, then, that there was correspondence between the Company and Mr. Baker, which resulted in these proceedings being taken. He had tried to make the matter as concise as possible; and he did not think the facts could be disputed.

A short consultation here took place between the learned gentlemen, at the close of which

Mr. ELLIOTT said he thought the Bench might take it that it was admitted on both sides that the account up to the 31st of December was not sent to the Local Authority on or about March 25; and he was willing to admit that subsequently they did send an account made up to the 30th of June.

* See JOURNAL, Vol. XXXV., p. 877; also Vol. XXXVII., p. 479.

Mr. LONGMORE said that was admitted on both sides.

In reply to the Magistrates,

Mr. ELLIOTT said that, with regard to the non-delivery of an account to the Local Authority, he was going on the year 1894; and on the summons for not keeping a copy to sell to the applicant, he went on the year 1893.

Mr. *A. Baker*, the complainant, was then examined by Mr. ELLIOTT. He said he first applied to the Company by letter on the 3rd of September for the balance-sheets; and on the 4th, he made personal application for them at the works. He applied for balance-sheets from 1890 down to the present time; and he paid 5s. for the copies. The Company still had this money.

Mr. LONGMORE intimated that he had no questions to put to witness.

Mr. ELLIOTT said this was his case.

Mr. LONGMORE then addressed the Magistrates on behalf of the Company. At the outset, he objected to the extraordinary course taken by the complainant in laying the information before the County Justices instead of those for the borough—a proceeding which, he said, was almost unprecedented. Coming to the case itself, he said that, in order to put it fairly before their Worships, he must trouble them with a short *résumé* of the law on the subject. The Gas Company, as he understood it, were, save in so far as the Legislature had made exception, in the same position as any other trader with regard to their accounts; and neither the Magistrates nor any Court had power to inquire into them. It was true that certain alterations in the law regarding gas companies had been made in the interests of the consumers. In the first place, it was provided that they should not make a profit exceeding 10 per cent. in any one year; and he could show them that for years and years the Hertford Company had not made anything like this profit. Next, the Legislature provided that, should they in any subsequent year make more than 10 per cent., they could put back into the preceding years' accounts a sum so as to make up for each year a profit of 10 per cent. In addition to this, the Company were entitled to put by a reserve fund of 10 per cent. upon their capital. With these exceptions, they stood upon exactly the same footing as anyone else with regard to their accounts. But in order to enable the public to see whether the Company were in fact making more than 10 per cent. profit, or were giving their shareholders more than 10 per cent., or had put by more than a reserve fund of 10 per cent., certain power was conferred with regard to the accounts. As his friend had properly stated, up to the year 1871 the Gas-Works Clauses Act, 1847, laid down that the accounts should be made up and sent to the authorities at a certain time each year. The accounts of the Hertford Gas Company were so made up and sent to the Clerk of the Peace. This was in order that, if anyone found that more than 10 per cent. had been made, or more than this sum put by, he would have been entitled to inquire into the matter through the Court of Quarter Sessions. But the Court was limited solely to inquiring into the previous year's accounts. Once they had let a year go by, they could not take proceedings with regard to that year. Then came the Act of 1871; and no doubt the Magistrates, after hearing the most lucid statement of Counsel, might have come to the conclusion that the accounts should have been made up to the 31st of December, and not to the 30th of June. But when he had drawn their attention to section 3 of the Act of 1871, they would see how easily an ordinary director, in reading the section, might have come to a contrary opinion, because it said: "The provisions of this Act shall apply to every gas undertaking authorized by any Special Act hereafter passed." There was the fact that the Hertford Gas Act was obtained in 1864, whereas the Act he had referred to, which was to affect any subsequent Act, was not passed until 1871, seven years later. It was true that, in the year 1881, the Judges in the Dudley case, which his friend had quoted, came to the conclusion that, notwithstanding these words, the Act of 1871 applied not, as the Legislature had said, to "any Special Act hereafter passed," but to any company, such as theirs, whose Act had been previously obtained. Any ordinary director, relying on his own reading of the law, would not unreasonably suppose that his accounts were properly prepared if they were made up to the 30th of June. He wished the Bench to clearly understand that the only real interest which the public had in these accounts was for the current year. The accounts of 1893 were merely waste paper now. His friend had them; but he had no interest in them, for they could not be re-opened in the least degree. It might be well for him (Mr. Longmore) to show what had led to the present unfortunate position of the Company. The management of the works was vested for some years in a family of the name of Brett. He believed they had been connected with the works nearly since their establishment; and they were most trusted servants in every way until the unfortunate events of this year. At the beginning of the year, his clients found the arrears were getting unusually large; and, not being satisfied, they called in an expert, in the person of Mr. Alfred Lass, whom he should call as a witness. Mr. Lass went into the matter, and reported that the arrears account was unusually large; and he advised that the accounts, before being sent out, should be checked with the books. The Bretts were told to make up the books; and, so far as he knew, those books were on the 15th of January at the office of the Company. That night they disappeared, and had never been heard of from that day to this. How they went, they could not very well say; but they could form a very strong suspicion. However, there the Company were—left on the 15th of January without any books. There was the law staring them in the face—they had to make up their accounts to the 31st of December. The Magistrates would not be surprised to hear that, these books having disappeared, the affairs of the Company were in a terrible condition. Large numbers of consumers disputed their accounts; and it was not until those for the quarter ending March 31 had been sent in that the Directors were able to ascertain in the least degree how they stood. He thought that, if any excuse were needed, this was abundant excuse for the accounts not being made up to the 31st of December last. Mr. Lass went carefully into the matter. The Bretts were discharged; and a new Manager was appointed, together with a new Collector, and a new Auditor; and every endeavour was made to put the Company in a proper financial position. He could truthfully say that, if they would allow them to go on under the new management, their affairs would be conducted in a satisfactory manner. His clients had done all they could to put themseves in a proper legal position; and they had failed in doing what was absolutely impossible. Whom did they have on the other side? Mr. Baker, who ever since the year 1881 had had the Dudley case burning in his brain; but not until the books were lost, and the accounts could not be made up, did he play his trump card. With the Company in their present unfortunate position, he said to himself: "Now is my time to punish them, and to drag them before the Bench." There was a section in the Summary Jurisdiction Act of 1879 which, he ventured to think, was admirably adapted to meet the present case. Section 16 provided that if, upon the hearing of any charge for an offence punishable on summary conviction, the Court thought that, though the charge was proved, the offence was of so trifling a nature that it was inexpedient to inflict any punishment, they might, without proceeding to conviction, dismiss the information. Was there, he asked, ever a case, since that Act was passed, to which the section more directly applied than the present one? In one summons, what was Mr. Baker's grievance? That there was no delivery to the Local Authority of the accounts made up to 31st of December last. Beyond the mere possession of that document, what advantage could be gained, because the sole question which could be gone into was whether or not, during the past year, the Company had made a sufficient profit to pay the shareholders 10 per cent., fill up the reserve fund, and pay off all arrears of dividend, which would require a sum of £15,000 to accomplish. They all knew the shareholders had nothing last year; and it was therefore absolutely futile for the accounts to be deposited. This, then, was surely a case where it was inexpedient to inflict any punishment at all. With regard to the complaint of not selling the accounts for 1893, what advantage to anyone would they be? The time for going into the question of that year's accounts was past and gone. Was not that again a case of so trifling a nature that it was inexpedient to inflict any punishment? He urged the Bench, on behalf of the shareholders of the Company, who had had no dividend during the past year, and also on behalf of the consumers, in whose best interest it was that the Company should be allowed to go on unharassed, and of a large number of inhabitants of the town, to dismiss the case under the powers they possessed in the section of the Act he had quoted.

Mr. Alfred Lass, F.C.A., was about to be called, when an opinion was expressed by the Chairman that it was unnecessary.

The Magistrates then retired for a short time. On their return,

The CHAIRMAN said: The Court has carefully considered this case so ably put before it by both the prosecution and the defence, and is unanimously of opinion that the Gas Company have committed two offences under the Act of 1871. But, as it is not shown that any injury of a public or a private character has been done, they will impose a fine of only 1s. for each offence, and the ordinary costs.

The fines—1s. and 9s. costs in each summons—were at once paid; and the proceedings terminated.

ABERDARE POLICE COURT.—Tuesday, Oct. 29.

(*Before Mr.* R. H. RHYS, *Chairman, and a Bench of Magistrates.*)

Defrauding the Aberdare Gas Company.

To-day Charles Rosser, landlord of the Freemasons' Tavern, was summoned for "laying or causing to be laid a pipe to one of the service-pipes of the Aberdare Gas Company, without their consent, and for allowing the same to be connected from the 30th of September, 1892, to the 3rd of October, 1895." He was also summoned for having unlawfully and fraudulently abstracted, by means of this pipe, a quantity of gas, the property of the Company; and he was further summoned to pay the sum of £51 15s. 2d., damage sustained by them by the abstraction of the gas.

Mr. C. KENSHOLE prosecuted; Mr. T. PHILLIPS defended.

Mr. KENSHOLE, in opening the case, said the defendant was charged with two distinct offences. The first was laid under the 18th section of the Gas-Works Clauses Act, 1847, under which defendant was liable to a penalty not exceeding £5 for the offence, together with a continuing penalty of 40s. a day. Under the Gas-Works Clauses Act, 1871, he was also liable to a penalty of £5 for abstracting the gas; and the Company were entitled to recover the amount of damage done to them by such abstraction. The circumstances of the case, which he would prove, were as follows: Mr. Rosser was a gas consumer; and his house was divided from the house of a Mr. Wilson, his brother-in-law, by a passage. Covering a portion of the passage was a store-room. The Company's mains were laid up through Wind Street in front of these houses; and the service-pipe ran into the passage, and thus under the store-room. Just inside the passage, a branch was carried into the cellar through Mr. Rosser's meter for lighting the house; and some distance farther on there was another branch into Wilson's premises. On the 3rd of October, Mr. Ashman, a meter inspector, went into the defendant's cellar for the purpose of ascertaining the quantity of gas burnt during the previous quarter; and in order to do so, he lit the gas. Having taken down the figures, he turned off the tap; but, to his astonishment, he found the gas still burning at the jet. He then watched the dial of the meter, and found that no gas was passing through. He at once went to see Mr. Rosser; but he was not in. Later in the day, he procured the key of the store-room above the passage, and discovered that a pipe had been connected at the outlet into Mr. Wilson's house, which ran back 20 feet to Mr. Rosser's premises. The result, of course, was that all the gas passing through this pipe—a 5-16ths inch compo. pipe—did not go through the meter, and none of it was registered. Later in the day, he saw Mr. Rosser, who insisted on two occasions that he knew nothing about the matter. But on the following Monday he sent for Mr. Ashman, and admitted that it was done by a man named Thomas, a gas-fitter, now residing at Hirwain, upwards of two years ago; and he expressed his regret that he allowed it. The Company had since ascertained that it was done in January, 1892. They had also found out that for two years prior to January, 1892, Mr. Rosser's average consumption of gas was 19,550 cubic feet per quarter. Since then it had fallen to 13,560 cubic feet per quarter on an average; being, as their Worships would see, a reduction of 6000 cubic feet per quarter. They would notice the claim was made for £51 15s. 2d. He and his friend Mr. Phillips had carefully gone into the matter, and it had been agreed

that the defendant should pay to the Company a sum of £30; and he asked for an order for this amount. That was independent of the offence. If he could make out a case under the 38th section of the Act of 1871, he would ask the Bench to impose such a penalty as they thought fit. He did not intend to proceed against Mr. Rosser on the charge of laying on the pipe, but only for abstracting the gas.

The CHAIRMAN: What is the effect of a conviction under that section?

Mr. KENSHOLE: It is simply a penalty, not a felony.

Mr. *Ashman* was then called, but

Mr. PHILLIPS intimated that they were prepared to admit all the facts set out in Mr. Kenshole's opening speech.

Formal evidence was then given; and the defendant was ordered to pay £30, as agreed, and also a fine of £5 and costs.

Attempt to Defraud The Gaslight and Coke Company.

At the Westminster Police Court last Saturday, before Mr. De Rutzen, James Barnes Amor, who described himself as of no employment, and living on his wife's means at No. 193, Victoria Street, Westminster, appeared to a judgment summons, to show cause why he should not be committed for a debt and costs of £20 17s. due to The Gaslight and Coke Company. The wife of the defendant recently met a distress levied on furniture of considereble value with the objection that it did not belong to the defendant, but to her trustees, under an ante-nuptial settlement made in 1882. The Magistrate stigmatized the proceeding as a "swindle." But the Company were subsequently advised that they had no legal status; and, after Mrs. Amor's trustees had presented a statutory declaration, the broker in possession was withdrawn. Mr. Arthur Dove, for the Company, now asked for the committal of the defendant, on the ground that the marriage settlement was a fraud on his creditors. Not only did it cover all property he had at the time of his marriage, but any he might thereafter become possessed of. Under the deed, he never could become possessed of any property. Defendant, who was examined as a witness, attributed his inability to pay to want of success in trade. During twenty years' trading in a large way, at various places, he had, he said, paid the Company between £12,000 and £15,000. The Company were very hard on him. Mr. De Rutzen: You mean you are very hard on the Gas Company. It is a most disreputable detence—a shameful fraud on the Company. The Magistrate adjourned the case for two months, to see if defendant kept a promise to pay the debt by instalments.

The Price of Gas for Public Lighting at Wrexham.—The Secretary of the Wrexham Gas Company (Mr. T. Walker) has informed the Lighting Committee of the Town Council that the Directors have resolved to reduce the price of gas consumed in the public lamps by allowing a further discount of 3d. per 1000 cubic feet from Jan. 1 next. This action of the Directors was quite voluntary; and the Council, at their meeting last Tuesday, decided to acknowledge the concession by a letter of thanks.

Stokers' Wages.—A discussion which took place at the last monthly meeting of the Dalton Gas Committee indicates how the wages of stokers vary in different parts of the country. A Sub-Committee reported their appointment of a second stoker at the works, at a salary of 22s. per week. Mr. Kay asked if this was a "living wage." Mr. Robinson said it was not, for seven days a week; and he moved that it be increased to 24s., which, he said, was little enough for the work. Mr. Holt seconded the amendment; saying that 22s. was too little for 84 hours' work a week. On a division being taken, it was found that the voting was equal. The Chairman gave his casting vote for the confirmation of the Sub-Committee's proceedings; remarking that the stoker could apply for an increase if he wanted it.

Accident at the Keswick Gas-Works.—On Monday evening last week, an accident occurred to three men named Forrester, Penrice, and Swindle, who were engaged in the construction of the new holder at the Keswick Gas-Works. They were standing on a scaffold inside the holder, about 18 feet from the bottom, and were hauling up a heavy iron beam, when by some means a chain which helped to support the scaffold snapped; and Forrester and Penrice were precipitated to the ground, bringing the scaffolding, &c., with them. Swindle, who had one arm over the side of the holder, had the presence of mind to cling to it; and he hung suspended until rescued from his dangerous position. Forrester was found to have sustained a comminuted fracture of the left leg below the knee; and Penrice was badly cut about the head. Two doctors were quickly summoned; and the injured men were removed to the Cottage Hospital, where they are now doing as well as can be expected. The sudden snapping of the chain has been attributed to the effects of frost, which was intense at the time.

A "Gas Car" at the Aldershot Carnival.—Last Wednesday evening, the town of Aldershot was the scene of a brilliant spectacle in aid of the local hospital. The place was brilliantly illuminated; and there was a grand procession. As showing the interest taken in the affair—the "Annual Carnival," as it is termed—something like 30,000 people, residents and visitors, were in the streets. We notice the matter here to mention that the Aldershot Gas and Water Company did not lose the opportunity of bringing the advantages of gas for culinary purposes under the notice of this great gathering. They had in the centre of the procession a "Gas Car," showing the past and the present method of cooking. The "past" was represented by an old-fashioned kitchen range, with sooty iron saucepans, and an ancient dame using a pair of bellows to get a small flame. The "present" was shown by a gas-stove (supplied by gas through a "penny-in-the-slot" meter) whereon, in bright copper and tin cooking utensils, soup and vegetables were boiling merrily, and in the oven a leg of pork was being roasted. The car was decorated with coloured lamps, and further lighted by gas-brackets; cylinders charged with gas being carried for the purpose. Mr. W. J. Ball, a gas engineer, who sent the car, took charge of it; and he must be credited with not only making a pretty show, but also an effective advertisement as to the value of gas. The Judges highly commended the car.

MISCELLANEOUS NEWS.

DISASTROUS EXPLOSION IN THE STRAND.

Since the memorable explosion of gas which occurred in Tottenham Court Road in July, 1880, no accident of anything like so alarming a character has been attributable to this cause in London. Last Tuesday, however, two houses were wrecked in the vicinity of the Strand, and a number of persons more or less seriously injured—one fatally; and gas has been pretty generally charged with being the origin of the mischief. The scene of the disaster was New Church Court—a passage on the north side of the Strand, facing Somerset House, and running into White Hart Street, which connects Catherine Street with Drury Lane. Residents in London will doubtless know the place; and visitors from the Provinces, especially those of a literary turn of mind, will probably have been to the court, at the western corner of which formerly stood the office of the *Morning Chronicle*, with which the early efforts of Mr. Charles Dickens in newspaper work were associated. In fact, if we remember rightly, this was the "dark court" up which the great novelist went some sixty years ago to tremblingly drop his first contribution into the editor's box. The thoroughfare is about 80 yards long, and 12 feet wide at its broadest part. The houses consist mostly of somewhat dilapidated three and four storey buildings, occupied by porters employed in Covent Garden Market hard by, costermongers, and people of a similar class; but there are also some business premises, and the kitchen of a *restaurant*. About seven o'clock in the evening of the above-named day, the occupants of the court and the pedestrians in the more crowded Strand were startled by a loud report, followed by clouds of dust, an outburst of flame, and a terrible consternation. Communication was at once made with Scotland Yard and with the head-quarters of the Fire Brigade; the result being that a large body of police and firemen were quickly on the spot. On entering the court, they found that a house on the west side (No. 27) had collapsed, carrying with it portions of the walls and roofs of the adjoining houses. The excitement that prevailed may well be imagined. The work of rescue was promptly commenced; but great difficulty was necessarily experienced on account of the heat from the blazing ruins. An urgent message sent to the offices of The Gaslight and Coke Company in the Horseferry Road soon brought some of their men, who expeditiously cut off the supply of gas, which was conveyed into the court by a 4-inch pipe from the large main in the Strand. All the occupants of the damaged houses were rescued alive, and those who had sustained injuries were conveyed to the neighbouring hospitals and detained where this was considered necessary. There were certainly some marvellous escapes, one of which is sufficiently remarkable to place on record. When the house No. 27 collapsed, a woman who was on the top floor with her two children was borne to the ground with the building without injury; the only effect on her being a shock. While some of the Fire Brigade were engaged in searching the ruins, a portion of the upper part of one of the houses, which had been left suspended, gave way; burying two of the men, named Sells and Sprague. After about an hour's work, the former was recovered, and was found to be suffering from nothing worse than an injured leg. His comrade, however, was still beneath the mass of fallen material; and it was feared that he was dead. At midnight, the scene of the disaster was distressing in the extreme. The search for the missing fireman was proceeding with the aid of the ordinary lamps carried by the Brigade; but later a 6-inch gas-main entering the court from the north end was tapped, and some "flares" were set up. These greatly assisted the searchers, whose untiring efforts were eventually rewarded by the discovery of Sprague about five o'clock on Wednesday morning, after having been buried for nearly ten hours. He was removed in an unconscious condition to King's College Hospital, where his injuries were found to be of a very severe character. At first it was thought that these would not prove fatal; but the unfortunate man succumbed to them in the evening.

Among those who visited the scene on Tuesday evening were Lord Carrington, the Chairman of the Fire Brigade Committee of the London County Council; Mr. Anderson, the Chief of the Detective Department, and Chief Inspector Melville, of the Special Department, at Scotland Yard. The Gas Company's Distributing Engineer (Mr. G. F. L. Foulger) was also present on Tuesday night, superintending the operations of the Company's workmen. The next morning an examination of the spot was made by Colonel Majendie, C.B., the Chief Inspector of Explosives. The following is from the official report of the Chief Officer of the Fire Brigade (Captain Sexton Simonds): "Nos. 26 and 27, New Church Court, contents severely damaged by explosion and fire, and fallen down; 27 persons injured by shock, contusions, cuts, and bruises, and taken to hospital. The supposed cause of the fire was an explosion of gas. No. 25, part of side and front blown out; rest of the building and contents severely damaged by explosion. No. 24, building and its contents damaged by explosion. Nos. 329 and 330, Strand, side, front, and ground floor and contents severely damaged by explosion and dirt. No. 331, Strand, window-glass broken; No. 332, Strand, roof, sky-lights, and window-glass damaged by explosion and breakage; No. 333, Strand, back damaged by explosion; rest of the building and contents slightly damaged by breakage and dirt. Four houses in Angel Court, back part of the buildings and contents damaged." As far as we can learn, no gas was used in the wrecked houses; and how any could have found its way into the basements, which we believe were unused, and become ignited, is at present unexplained. Colonel Majendie has made further examinations of the spot; but he will probably make a more minute investigation after the wreckage has been cleared away. It may be pointed out that no definite cause of the explosion is given in the report of Captain Simonds.

The inquest on the unfortunate fireman—happily the only victim of the disaster—was opened at the St. Clement's Danes Vestry Hall yesterday, before Mr. Troutbeck, the Coroner for Westminster. After a number of witnesses had been examined, the proceedings were adjourned for a fortnight. In the meantime, the pavement in the court will be removed in the presence of representatives of the Gas Company, the New River Company, and the London County Council; and then further evidence will be given.

THE GAS QUESTION IN LIVERPOOL.

At the Meeting of the Liverpool City Council on Monday, the 28th ult.—the final gathering prior to the municipal elections—the action of the Corporation on the question of the gas supply of the city was the subject of an animated discussion.

Alderman BOWRING having moved the adoption of the general proceedings of the Finance Committee,

Sir A. B. FORWOOD said that, at the last meeting of the Council, a resolution was passed instructing the Town Clerk to do all that was necessary to establish and maintain a competitive gas supply. He should have expected to find in the proceedings of the Finance Committee some reference to this resolution, and some explanation offered as to why they had not given effect to it. However, he thought they knew the reason. It was perfectly clear that legally the Corporation had no power to promote a Bill in Parliament for competition, either against a gas or a water company. He thought that, if the Council had known all the facts both as to the law and as to what had transpired between the Corporation and the Company, they would not have committed themselves to such a resolution, especially in view of the fact that a letter had been received from the Company which was not mentioned to the Council, stating that, pending the result of immediate investigations into the matter, they considered it advisable to defer arrangements for another interview with the Special Lighting Committee. It was very unfortunate that the Council, by passing a resolution to which they could not give legal effect, should have established a state of friction and tension between the Corporation and the Company, and so have prevented free and friendly communication between the Committee and the Directors, by which they might very possibly have found a way of modifying the relations between the two bodies, and benefited the community at large.

Alderman BOWRING said the Finance Committee were advised that there would not be time to prepare a Bill for next session, and that moreover there were difficulties in the way of getting it passed. He would ask the Town Clerk to state exactly what was the legal position of the Corporation, and the reasons which led the Committee not to carry out the orders of the Council.

Alderman T. HUGHES pointed out that if, at the time the resolution was passed, the Town Clerk had been asked to state his views, they would have been saved all this trouble and inconvenience. He could not help feeling that there were some gentlemen in the Council when the resolution was carried who knew exactly what the Town Clerk's opinion was; and he thought it was somewhat of a dereliction of duty that this opinion was not asked then instead of now.

The TOWN CLERK explained that, on the 2nd of October, he was instructed by the Council to do all that was necessary to enable the Council to promote a Bill in Parliament to obtain powers to establish and maintain a competitive gas supply. To do this, it would have been necessary for him to have a scheme of competitive gas supply prepared. Of course, he did not feel capable of doing this himself; and he would have had to employ experts to prepare one—to tell him where the works were to be situated, and to describe the land it was necessary to buy—and he would have had to engage a staff of referencers to prepare a book of references and the plans to be deposited. To his mind, it was quite impossible to have this done in time to give the necessary notices for the forthcoming session. Furthermore, he was obliged to tell the Finance Committee that the Borough Funds Act did not authorize the expenditure of money out of the rates for the purpose of promoting a Bill to compete with the Gas Company, and that it would be necessary for the members of the Committee personally to undertake the responsibility of paying the expenses. (Laughter.)

Alderman F. SMITH: So they are. (More laughter.) Proceeding to address the Council, he said the position of Sir Arthur Forwood and his friends was one of laughter at the position of the Liverpool gas consumer. ("Hear, hear," and great laughter.) Sir Arthur knew nothing about the gas question. (More laughter.) Even an eminent authority like Alderman Thomas Hughes tried to count-out the Council when the gas question was coming on; and then, not succeeding, he deliberately deserted the Council Chamber. He (Alderman Smith) was aware of the fact that the fiat had gone from Sir Arthur Forwood and Alderman Thomas Hughes that his (Alderman Smith's) hand must be stayed in this gas matter; but they were quite powerless to stay it. (More laughter.) It was all very well for them to smile. But when they had ceased smiling, they would come to look at the matter from a sensible, calm, and ratepayers' point of view; and when they did so, they would recognize that it was free from the interests of party. He contended that it was time the law of the land was altered so as to prevent the Gas Company paying what had been called "the phenomenal price of 20s. 7d. a ton for coal." He hoped the new Council would not allow this subject to drop.

Mr. A. TAYLOR said he still maintained that the price paid for coal by the Company was "phenomenal;" but that was no reason why the Council should rush into a wholly impracticable and absurd position. He was willing to give Alderman Smith all the credit that he could get for his initiative with regard to the gas question; but he could only regret that he had shown himself so completely incapable of carrying it to a logical and proper conclusion. He did not believe in fighting with the weapons Alderman Smith had used in this contest. He did not see that anything was to be gained either by going to the press, appearing on public platforms, or coming to the Council and charging men of stainless reputations with either being present or using influence in the Council to benefit companies and concerns with which they were connected. He pointed out that, in the arbitration as to the price of gas to be paid by the Corporation for street lighting, the Corporation were completely ruled out of court; and yet the Company were willing to give the Corporation a rebate of 10 per cent. Alderman Smith was nothing if he was not in a hurry; and he (Mr. Taylor) maintained that his action in proposing the resolution for a competitive gas supply served to show more clearly his entire lack of practical procedure and straightforward and amicable conduct of negotiation.

Alderman T. HUGHES, replying to the observations of Alderman Smith, said he deliberately left the Council at the former meeting because he felt it to be a complete waste of time to listen to the Alderman's observations upon the motion which was afterwards passed. He had previously expressed this opinion to one of the Liberal leaders in the Council Chamber, and suggested to him the advisability of consulting with the Town Clerk, in order that the proceedings, if found to be useless and impracticable, might be shortened. He (Alderman Hughes) was not going to remain in the Council knowing that the whole discussion was a *fiasco*. Had his advice been taken, a great deal of trouble and inconvenience would have been avoided; and the ratepayers of Liverpool would have been in a better position for negotiating with the Gas Company. Long ago he told Alderman Smith that the best way of securing an improvement would be to get rid of the obsolete rule requiring gas of 20-candle power. The price of coal was altogether dependent upon this obsolete requirement. The Company had challenged them to do away with it, and then they would be prepared to manufacture gas as cheaply as any other community. The Council had made themselves a laughing-stock by passing Alderman Smith's resolution. They could not expect the Company to reopen negotiations so long as this resolution remained on their minutes. They would be bound to rescind it. He believed that the dividends paid to the shareholders, and other matters in connection with the Company, required revision; but let the Council at all events see that common sense guided their actions. It was ridiculous for them to attempt impossible measures in their desire to bring about a remedy. To suggest that the Directors of the Company were men whose characters should be viewed with caution, was not the way to open friendly negotiations.

Mr. R. D. HOLT said he did not in the least object to the Council being the laughing-stock of the Company. He believed that the controversy which had been evoked by Alderman Smith's motion would be highly beneficial. If the Council had unfortunately passed a resolution which they were unable to carry out, then, as honourable men, they had no other course but to go back upon it.

The LORD MAYOR (the Right Hon. W. H. Watts) said it had been suggested that those who voted for Alderman Smith's motion did so in ignorance. Certainly this was not his case. He was informed by the Town Clerk that the motion was illegal; and he put this question: "Do I understand you to say that, if the facts as stated are true, we are buying coals at 10s. per ton more than we could buy them at, and that, whatever extravagance may go on within the walls of the Gas Company, we have no redress?" The Town Clerk said: "I am afraid that is so." "Well, then," he replied, "I for one, at all events, will vote that we try that matter in the House of Commons." He thought it was perfectly scandalous that the Council should be in such a position; and no considerations of his being likely to be called upon to pay his fair quota for contesting that position in the House of Commons would have deterred him, nor did he think it would deter the citizens of Liverpool. If the statement was correct, as he believed it to be, that they were paying one-third more for their gas than they ought to pay, he thought they had a right to go to Parliament and ask them to redress that iniquity. Several gentlemen had stated that the Company must buy other and different coals in order to be in a position to reduce the price of gas. During his year of office, he had visited the Walton Workhouse, and saw a gas apparatus at work. He was told that they were there producing gas of a better quality than that supplied to the city of Liverpool, and that it cost, he believed, less than 1s., but certainly not more than 1s., per 1000 cubic feet. If this were so, they were not acting in a very out-of-the-way fashion in passing a resolution; and while he had the greatest possible respect for the opinion of the Town Clerk, he found that opinions differed. During the past few days, a legal gentleman connected with one of the largest corporations in the country called upon him, and expressed the opinion that, if the Council were to take the matter to Parliament, they would get redress. He (the Lord Mayor) voted for the resolution with his eyes wide open; and he was quite prepared to be called one of those who were unwise in so doing.

A whispered conversation here took place between the Lord Mayor and the Town Clerk, at the close of which his Lordship said he had been charged with misquoting; and he therefore asked the Town Clerk to correct him if he was wrong.

The TOWN CLERK said that, assuming the Corporation could prove that the Company were paying an absurdly exorbitant price for their coal, that they were wasteful in administration, and that consequently the gas consumers of Liverpool were being mulcted to an extent which they ought not to be under the Acts of Parliament, he thought the Corporation would have the right to go to Parliament to amend the Company's Acts in such a way as to force them to cease spending or wasting the money. He, however, had stated from the commencement—and it was what he had intended to convey to the Lord Mayor—that he did not think the right procedure was to promote a competitive gas supply. To his mind, when they were satisfied with their case, the proper course was for the Corporation to promote a Bill to amend the Company's Acts—not to establish a competitive gas supply.

The proceedings were then confirmed.

At a subsequent period, Alderman F. SMITH, in moving the adoption of the Lighting Committee's proceedings, said that on the 24th of June the Gas Company had all the facts before them to which the Committee required an answer. None was received by the 23rd of September; and a report was then placed in their hands. No investigation was commenced till the 2nd of October; yet on the 9th of that month the Company replied that the matter had been thoroughly gone into. He need scarcely inform the Council that to this moment the Committee had received no detailed reply to the detailed statement respectfully put before the Company.

Sir A. B. FORWOOD said he rose, in the first place, because the Council, at their last meeting, were led to adopt a resolution which had evidently made the Company feel that there was a hostile attitude entertained towards them; and they had consequently declined to communicate with the Lighting Committee on the subject. The point he started off with was this—that the Chairman of the Committee did not bring to the notice of the Council the fact that the report signed by himself, and containing very voluminous figures as regarded the comparison of the price of gas and the cost of manufacture in various towns, dated the 23rd of September, had been sent to the Company, and that, on the 30th of September, the Company

wrote back, in a very courteous manner, saying that this statement should have their immediate attention. Yet, in spite of this communication, the Chairman of the Committee, "off his own bat," brought forward that resolution, to which the Council could not give legal effect, and made no allusion, as far as he could see in the report of his speech, to the fact that only eight days before they had sent that important report to the Company. He could not conceive, whatever feeling there might have been in the minds of members of the Council towards the Company, that they would have thought it wise to take the very drastic step of promoting a Bill in Parliament until they had had that reply from the Company. This was the gravamen of his complaint against the report of the Committee; but the Chairman carefully avoided any allusion to it in his reply. They had heard a good deal about the price of coal; and they were asked to believe that the Company paid 20s. 7d. per ton, when they could have obtained it for probably 14s. or 15s. a ton. No one in his senses would believe that the Directors would be guilty of such an act as that. He asked the Chairman of the Lighting Committee to state whether it was not a fact that the period during which he said 20s. 7d. per ton was paid for coal was the half year of the coal strike, when the price of coal varied from day to day, and when it was not so much a question of the price as obtaining a supply. He believed that Sheffield was not affected in anything like the same degree as Liverpool by the coal strike. Sir Arthur referred to the high price which had to be paid for the cannel and Australian shale used in the manufacture of gas, in order to bring it up to the required candle power; and he thought it probable that the 20s. 7d. quoted by Alderman Smith was the average price of shale, cannel, and coal. If this were so, it was very unfair to lead the public to believe that he was giving the price of the ordinary coal used by the Company, which the public knew was only about 14s. or 15s. per ton. As to the illuminating power of the gas supplied, Sir Arthur said that required in Liverpool was 20-candle; whereas in Sheffield, about which so much had been said, it was 16½-candle. The results obtained on a visit to Sheffield by Mr. Bellamy were stated to be 20·40 candles; but he (Sir Arthur) pointed out that the Chairman of the Sheffield Gas Company stated that 1150 tests made during the six months ended June 30 gave an average of 17·86-candle power. He believed that, without going to Parliament in a hostile spirit, they could, by approaching the Company and treating them as, and believing them to be, honest men, get them to agree to provide the minimum candle power which they were bound to give, and also some security for direct representation from the Council on their Board.

Alderman SMITH, in reply, quoted figures to show that the price of coal at the pit's mouth during the year in which the strike occurred was only 2d. per ton more than in the previous year; whereas the Company had paid an increase of 2s. With regard to Mr. Bellamy's tests, he said they had never been disputed by the Company.

The discussion then ended.

EDINBURGH AND LEITH GAS SUPPLY.

Proposed Adoption of Water-Gas Plant—The New Chimney.

On Monday of last week, at a Meeting of the Edinburgh and Leith Gas Commission (Lord Provost M'DONALD in the chair),

Bailie KINLOCH ANDERSON, the Convener of the Works Committee, said the Committee had had a special meeting that morning, at which they had considered two very important subjects. The first was with respect to the introduction into the Edinburgh works of a carburetted water-gas plant. It would be within the recollection of the majority of the Commissioners that, more than a year ago, the Works Committee reported on the oil-gas enrichment process, and that the Commission generally approved of the report, remitting it back to the Works Committee to have the installation proceeded with. Shortly after that, and while the Committee were still negotiating with Mr. Young's Company, some change took place in the process, which was commonly known as the Peebles system. The new process was recommended by the patentee for large installations; and the old one, for smaller installations. The Committee re-visited the works at Peebles, and saw a miniature they had there on exhibition, showing the new system. The altered process suggested to their Engineers that it was somewhat like a different one which they had seen—the carburetted water-gas system—and they reported so to the Committee and to the Commissioners. The Committee, under the circumstances, thought they should see the latter process in its entirety. The result was that they went to the Belfast Gas-Works, and saw the carburetted water-gas process of Messrs. Humphreys and Glasgow in full operation there. They had before them a very elaborate report by Mr. James Stelfox, the Engineer; and it appeared to them that they should recommend the system to the Commissioners, as being a great advance in the process of manufacturing gas. He understood that this was really the first departure from the original method of making gas. Oil gas was a change, but the old retorts were employed; this was a new process, in which there were no retorts used, but cylinders. The Committee were highly impressed with what they saw at Belfast; and they waited to have further experience of the results of the working there. They wanted not to be too quick about the matter; and they were well rewarded; for while they got the experience at Belfast, they had the opportunity of seeing the process at work elsewhere, and to get independent reports. All these reports went to confirm the opinion formed by the Committee—that a carburetted water-gas process was the right thing to adopt. But in their inquiries in connection with the subject, they came upon another patentee, who produced the gas practically in the same way, but by a different plant. When they were in London last summer, visiting the Tottenham Gas-Works, they saw Mr. Westcott, of the Economical Gas Company. He then had only the drawings of his system; but he told them that it was at work in America in some 17 or 18 gas-works. He had then no plant at work in this country to show them; he had only the system on paper. At that time, he had concluded a contract with the Blackburn Corporation to put a first instalment of the Company's plant into the gas-works there; and he cordially invited them, if the matter would brook delay at all, to wait till that plant was in operation, as he was quite satisfied that the results he had obtained elsewhere would be fully realized in this country. The Committee agreed that they should see this plant at work, as they wished to secure the better system of the two. He was not going to say what was the opinion of the Committee upon the one as against the other. They were both good; but he wanted them to approve of the introduction of an installation of water gas in the Edinburgh works, and to remit back to the Committee to correspond with both of the patentees, and to ask them for specifications and detailed estimates of their respective systems. They would, in some measure, be guided by those specifications and estimates as to the one they would adopt.

Mr. EUNSON asked if it was wise to incur such a cost at this time. There was a great demand for electric light; and it was rumoured that the whole city would get that light by-and-bye. He thought they should be cautious.

Bailie KINLOCH ANDERSON remarked that Mr. Eunson might have concluded in his own mind that the Committee did consider everything. They had made several successful innovations at the gas-works; and he almost prophesied that this would be another, and that by it they would be able to compete better with the electric light.

Mr. KINNAIRD thought they should have an oil-gas plant erected in the Leith works.

Bailie KINLOCH ANDERSON said they wanted to try the system in the Edinburgh works first; and then, if they were satisfied with it, they would introduce it at Leith too.

The proposal was then agreed to.

Bailie KINLOCH ANDERSON said the other subject the Committee had before them was the acceptance of an offer for the erection of the new chimney at the Edinburgh works. They had had the estimates before them; and they recommended acceptance of the offer of Messrs. Robert Bruce and Sons, of Edinburgh, at the total sum of £3450, with extra rates of 6s. 6d. per square yard for rock, and £10 per vertical foot for excavations beyond the specifications. There was another offer which was lower in the principal sum, but it was much higher in the extras; and they thought, on the whole, Messrs. Bruce's tender would be the cheaper.

The offer was accepted.

Inauguration of Retort-House Machinery.

On Wednesday last, an installation of mechanical stoking plant was inaugurated in the Edinburgh Gas-Works. When the Commissioners erected a new retort-bench, space was left on each side for the working of machines, should they resolve to introduce mechanical stoking. These have now been introduced, and applied to 480 out of 660 retorts. The system adopted is the Arrol-Foulis; and four charging and four drawing machines have been procured. To provide power, a pair of hydraulic pumping-engines are employed, which keep an accumulator at a pressure of 400 lbs. per square inch. An arrangement has been made whereby the exhaust water, other than what is sprayed on the bar of the rake, is collected, and used over again. In connection with the stoking plant, there have also been fitted up four coal-breakers, each driven by its own engine. From the breakers, the usual arrangement is made of elevators, which carry the coal to large hoppers, capable of holding 20 tons each, situated on the top of the retort-stack. These are made to deliver coal at both sides of the bench into the hoppers of the charging-machines, which, as in other installations of the plant, are made to hold 5 tons each. Steam for the driving of the engines is furnished by two Babcock and Wilcox boilers, fired with breeze. The total cost of the new plant is a little over £7000; and it is expected that its working will effect a saving of about 1s. per ton. The plant has been erected by Sir William Arrol's firm, under the superintendence of Mr. R. Mitchell, the Engineer of the Edinburgh works.

The Gas Commissioners and a number of friends assembled in the retort-house, and witnessed one oven drawn and charged by the machines. Bailie Kinloch Anderson operated a machine in the drawing of one retort. Thereafter the company adjourned to the workmen's dining-hall, where luncheon was served—Lord Provost M'DONALD presiding.

The LORD PROVOST said that when, some years ago, the Corporation took over the gas undertaking, some people said it was a bad thing to do. Since then the works had been re-modelled to a large extent, and they had had considerable expenditure on street mains. But, notwithstanding all this, they had been able to show a splendid balance; and they had also been able to reduce the price of gas. He never believed that the electric light would affect the gas consumption. At present, they had a fair amount of electric light in the city; and, according to their own returns, the demand for gas was never greater than now. They had been exceedingly fortunate in the choice of the Committee. The Convener had taken the trouble to go and see the latest improvements and appliances in other places; and the result was that they were now introducing two very remarkable machines—machines that did work which no human being should be asked to do. Sometimes trades union people objected to the introduction of machines; but he did not think the most rigid trades unionist in the world would object to machines for doing that kind of work. The Commissioners had thought they should not let the day pass without in some way recognizing the services of the Convener of the Committee. He had the greatest pleasure in presenting to Bailie Kinloch Anderson a small memento of his public work.

The gift was in the form of a silver punch-bowl, and bore an inscription which stated that it was presented by the Commissioners in testimony of their esteem for Bailie Kinloch Anderson, and as a small memento of the introduction of improved mechanical appliances into the gas-works there.

Bailie KINLOCH ANDERSON said this was the first recognition he had ever received for any public services he had rendered; and he could assure them that he appreciated it very greatly. He esteemed it an honour when the Commissioners, five years ago, appointed him to be the Convener of the Works Committee. When he was appointed, the price of gas was at the very high rate of 4s. 6d. per 1000 cubic feet; but now it was 3s. Between the first year of the Commission and the past year, there was an increase of 216 million cubic feet of gas. They had 480 retorts set upon the regenerative principle; and they had also

introduced a high-level railway, by which they had increased their storage for coal. They had, in providing the hall in which they were met, done something also to improve the condition of their workmen. They were now paying their workmen £7500 a year more in wages than was paid by the old Gas Companies; and he thought the men were all thoroughly satisfied with their position. By the introduction of carburetted water gas, which they had resolved upon, they expected to be able to reduce the price of gas by 3d. or 4d. The saving in labour by mechanical stoking would be very considerable; but that did not weigh with the Commissioners. The great relief to the workmen was what had led the Commissioners to think of introducing mechanical appliances. He had much pleasure in accepting the gift. It would always be a pleasure to him to reflect upon that day.

Among the toasts honoured was the health of Bailie Kinloch Anderson and that of the officials of the Commission—Mr. R. Mitchell responding for the latter.

GAS AFFAIRS AT MANCHESTER.

The Working Up of Residuals—Housing of the Workmen—Prepayment Meters—The Sale of Gas-Stoves.

Two or three matters which will have an important bearing upon the future of the gas undertaking, claimed the attention of the Manchester City Council at their meeting last Wednesday. It was mentioned by the Chairman of the Gas Committee (Alderman Gibson), in moving the adoption of their minutes, that the Gas Committee were desirous of obtaining statutory powers to enable them to undertake the manufacture of residual products. This statement did not attract notice; but Mr. M'Cabe opened up a discussion by complaining that the Gas Committee had declined the application of the Sanitary Committee to purchase a plot of land and property adjoining the gas-works in Rochdale Road, for the purpose of aiding their workmen to have better dwellings. He thought the district was entitled to some compensation from the Committee for the damage done to it. Many hundreds of thousands of pounds profit had been made there, and spent in the improvement of other parts of the city; and he considered it not an unreasonable thing to ask the Gas Committee to do something for the locality which they had done so much to foul and make nasty. It was moved by Mr. Boyle, and seconded, that the portion of the minutes alluded to by Mr. M'Cabe be referred back for consideration. Alderman Gibson replied that the matter had been most carefully considered by the Sub-Committee and Committee. They could not at all see their way to the purchase of this property. As a matter of fact, they had no money which they could legally use for such a purpose. Alderman Walton Smith remarked that the Gas Committee employed a large number of people at their works; and he had certainly thought the Committee would enter sympathetically into the project. Alderman Clay supported the Gas Committee in the action they had taken. The relief asked for in this case, he said, would be a relief not of the tenants but of the property owners. Two other members having supported the amendment, Alderman Sir John Harwood said he had great sympathy with the work of the Sanitary Committee; but they were now proceeding upon mistaken lines. The workmen employed by the Gas Committee had the eight-hour day; and they were well paid. It was all to their advantage, and that of their families, that they should live in a healthy neighbourhood, two or three miles from the horrible slum district in question. The amendment was negatived, and the proceedings of the Committee were approved.

During the progress of the above discussion, Mr. Saxon asked if it were true, as stated in an election address, that working men were being swindled by being charged 3s. 4d. per 1000 cubic feet for gas supplied through the penny-in-the-slot meters. Alderman Clay and the Lord Mayor (Alderman Lloyd) protested against the use of the word "swindled;" and Mr. Saxon having explained that it was only a quotation from an electioneering address, the matter for the time dropped. Later on, however, it was referred to by Alderman Gibson, who declared that the "slot" meter gave very good value, and was an undoubted boon to the public. The answer to the charge of swindling was that the people were continually asking for more of the meters. He described the various appliances of which the purchasers of gas in this way had the advantage, and stated that the collectors of the Corporation brought in during the previous week more than £300 in pennies. He hoped they would soon have 15,000 customers.

The question of the sale of gas-stoves by the department was next introduced by Alderman Gibson, who moved the rescinding of the resolution of the Council passed on Feb. 15, 1893, approving a resolution of the Gas Committee to the effect that no gas-stoves should be sold by the Committee, except to those customers who had them fixed on hire, and then only at list prices. Alderman Higginbottom seconded the resolution, which was opposed by some of the members on the ground that it meant unfair competition with tradesmen. Alderman Higginbottom said the Gas Committee merely proposed to follow the example of other towns, and to fall back on the position of eighteen months ago. The more gas-stoves the Corporation sold, the more work would there be for the plumbers in the way of fixing them, and so on. The Corporation would sell at such a price that the tradesmen who sold stoves were left a margin of 15 or 15½ per cent. Alderman Gibson thought that many people, if they could not buy their stoves from the Corporation, would not buy them at all. He maintained that the very fact of the Corporation selling stoves, made the business twice as brisk for tradesmen. The proposal of the Committee to rescind the resolution of 1893 and to give the Committee power to sell stoves was agreed to.

Cape Town District Water-Works Company, Limited.—The report of this Company for the year ending June 30 states that the net profit is £4737, making, with the amount brought forward, a total of £5406. The Directors propose to place £2000 to depreciation of mains, machinery, and buildings, and to pay a dividend of 3 per cent.; carrying forward £1006.

FURTHER GAS-WORKS IMPROVEMENTS AT WALLASEY.

Local Government Board Inquiry.

Last Thursday, an inquiry was conducted at Wallasey by Mr. R. Walton, on behalf of the Local Government Board, with reference to an application by the District Council for powers to borrow £22,000 for the extension of the gas-works. The Clerk to the Council (Mr. W. C. Danger) stated that all the last loan of £50,000 on gas-works account had been expended, except £1700; and the Engineer (Mr. J. H. Crowther) now found that he was unable to utilize the works which had been erected without further extension of plant, &c. It was therefore proposed to provide, among other improvements, a new gasholder at a cost of £15,700. In addition, £2200 was required for extensions of gas-mains, and a similar amount for water-mains. Mr. W. G. Ellery gave evidence to the effect that in 1871 the gas made exceeded 31 million cubic feet; in 1881 it amounted to 66 millions; in 1891, to 147 millions; and in the year ended March 31 last, to 182 million cubic feet. The consumption of gas had thus more than doubled in ten years. The present storage capacity was only 753,000 cubic feet; and it was proposed to provide a new holder, having a storage capacity of 750,000 cubic feet, which would bring the storage up to 1,500,000 cubic feet. In answer to the Inspector, Mr. Danger said the population of the district was increasing at the rate of 1200 a year. They hoped that the present application would meet all the wants of the district for eight years. Mr. Crowther having explained the details of the scheme, the proceedings closed with an intimation from the Inspector that he would report as early as possible.

RETFORD CORPORATION GAS AND WATER SUPPLY.

Annual Reports.

The annual report of the Retford Corporation Gas Committee shows that the capital expenditure during the year has been £1376, of which sum £1275 is the amount paid during the twelvemonth on account of the cost of renewing and enlarging one of the gasholders. The amount now over-expended on capital account is £1451; and the Committee propose to provide for this sum by transferring to the capital account £1500 from the amount now standing to the credit of the net revenue account. The gross profit for the year is £2841, exceeding by £156 the gross profit of the preceding year, which was then the largest made since the undertaking passed into the hands of the Corporation. The net profit, after paying all dividends, interest, and sinking fund, is £1385, which, with £1641 brought forward from last year's account, makes the amount now standing to the credit of the net revenue account £3026, out of which it was proposed to transfer £1500 to the credit of the capital account, as mentioned above. The net profits for the year are £489 in excess of the net profits for the preceding year. This is in part accounted for by the fact that, in consequence of the re-arrangement of a large portion of the loans, the undertaking has in this particular year had to pay considerably less for sinking fund and interest. The total loans raised for the purpose of the undertaking amounted to £36,500; the rate of interest being 4 per cent. The sum of £5000 has been paid off by means of the sinking fund. During the year, £28,000—a further portion of the £36,500—has been paid off; and a new loan of the like amount has been obtained from the Yorkshire Penny Bank, at 3¼ per cent., which will effect a saving of £210 per annum. The cost of this transaction was £210, and has been paid out of revenue. The £3500, the balance of the £36,500, cannot be dealt with at present, the term for which it was borrowed not expiring until April 29, 1897. The Committee consider the works to be in a more perfect and satisfactory condition in all respects than they have ever been since they came into the possession of the Corporation.

The Water Committee report that £18 only has been expended on capital account during the year; leaving £99 as the balance still unexpended of the £21,500 raised. Of the £21,500, £6737 has been paid off by half-yearly instalments, leaving £14,763 as the amount still outstanding. During the year, £9579—the balance of the loan remaining due to the Public Works Loan Commissioners, for which interest at the rate of 3⅜ per cent. per annum was paid, has been paid off, and re-borrowed from the Yorkshire Penny Bank at 3¼ per cent. The Committee have also given notice to the Northern Counties Investment Trust, Limited, of their intention to pay off £3935 remaining due to them on Jan. 1 next. This loan bears interest at the rate of 4 per cent., and can be re-borrowed at 3¼ per cent. The water-rents for the past year amounted to £2284, as compared with £2128 in the preceding year; and notwithstanding the extra expenditure caused by the long and severe frost of last winter, and the expenses of transferring the loan from the Public Works Loan Commissioners to the Yorkshire Penny Bank, the net profit for the year, after paying the interest on the loans and the instalments on account of principal falling due during the year, amounts to £233, as against £192 in the previous year.

THE DUBLIN CORPORATION AND THE GAS AND WATER SUPPLY.

The Improvement Bill to be Reintroduced.

A Special Meeting of the Dublin Municipal Council was held last Saturday week—the Lord Mayor presiding—"for the purpose of considering what steps should be taken during the ensuing session of Parliament for the purpose of obtaining legislation on matters the necessity for legislation on which was of the most pressing importance."

The Lord Mayor, in opening the proceedings, said the history of their doings last year, when they sought to obtain powers which they were now seeking (with some other powers in addition) was past; and he did not now care to revive it. They were then, he believed, prevented from obtaining what they considered useful legislation by agitation

which was got up in the city—partly, he believed, through want of knowledge of their real purpose, and partly because they embraced in their Bill a number of objects which more or less invited opposition. The questions which were to be dealt with now were considered by their Committee ones on which there should not be among ratepayers any divergence of opinion—matters of vital importance. They should limit the Bill to obtaining powers to adjust the relations between the Corporation and the out-townships with reference to the water supply. Then another provision proposed to endeavour to settle the "horrid wrangle" which had taken place between the local authorities and the Gas Company in reference to the supply of gas, the price of gas, and the quality of gas. They sought also other powers. The present Bill differed from the former in that they omitted certain clauses in reference to the water supply. But he thought they were entitled, in justice, to demand from the townships payment for any supply of water over 20 gallons per head. The other question of great importance was that of gas. Now he approached this question always with great regret, because he was sorry to find the Corporation in conflict with such a body as the Gas Company; and he earnestly trusted some means might be devised by which, while giving the Company the utmost limit of fair play, and not depriving the shareholders of one penny to which they were entitled, this Bill might put an end to these disputes, and some *modus vivendi* might be arrived at by which they should continue to exist in harmonious relations with the Company. They said that the price of gas was too high; and he wished there were some tribunal nearer home than London to which they could submit the question. After explaining the other provisions to be incorporated in the Bill, he moved: "That an Improvement Bill be promoted in the next session of Parliament for the following objects, and that the expenses be charged on the Borough Fund: 1. To alter and modify the existing arrangements for the supply of water by the Corporation to certain of the adjoining townships. 2. To alter and modify the existing arrangements for the supply, price, and testing of gas in the city. 3. To further extend the provisions of the Local Officers' Superannuation Act, 1869, so as to include labourers and other servants in the employment of the Corporation of Dublin. 4. To enable the Corporation to make charges for wayleaves, and to fence vacant lands. 5. And, to make increased provision for Fire Brigade purposes out of the Public Water-Rate."

Alderman MEADE, seconding the motion, said that the Committee of the Whole House had gone most carefully into the clauses of the Bill of last year; and they omitted the contentious clauses of that Bill, so that they could now promote a Bill which would meet the requirements and desires of the citizens as citizens and ratepayers. Of course, they knew that, so far as the Gas Company were concerned, the Bill would be contentious; but the citizens of Dublin were entitled to get gas at a lower price and of a better quality. At the same time, the Corporation were prepared to meet the Directors of the Company in every fair way, while determined to put an end to the bickerings and expense which had been going on in years past. In Dublin, the Corporation were asked to take gas that was tested by an antiquated instrument; and when they sought to have it tested by a modern instrument, they were told that they were bound by their contract. They certainly were entitled to have the gas tested by a proper instrument. As to the water question, the Corporation were prepared to carry out their contract with the townships; but the townships had no right to use an excess of water for which they did not pay.

After an ineffectual attempt to introduce some very contentious clauses to alter the municipal franchise—the proposal being ruled out of order by the Lord Mayor—the motion was carried unanimously.

THE GAS-WORKS PURCHASE QUESTION AT SOUTH MOLTON.

A Special Meeting of the South Molton Town Council was held last Thursday—the Mayor (Mr. A. E. Shapland) presiding—for the purpose of receiving the report of Mr. H. A. Willey, of Exeter, who had been consulted with reference to the proposed purchase by the Corporation of the undertaking of the Gas Company. The document stated that the works were generally in very good working condition; and the apparatus was capable of producing a maximum quantity of 6 million cubic feet of gas per annum. The retorts were of modern design and yielded good results. The condensers, scrubber, purifiers, station meter, and governor were of ample size, and equal to new. With regard to the storage, this was adequate for all present purposes. The tank was a good, sound one; and the holder was in fair working condition. He was quite satisfied that the distributing mains were sound, and would, if undisturbed, endure for many years. He considered the Council would do well to accept the offer of the Company by purchasing the property for £3300, particularly having regard to the fact that the Council were large consumers of gas. There was not a shadow of doubt that, in the hands of the Council, the undertaking might be successfully and profitably managed at a considerable reduction in the price of gas. The Mayor said he considered the report was in every way satisfactory, and bore out all his previous statements. He thought it was a fitting termination to his Mayoralty that he should have been instrumental in bringing this question of buying the gas-works before the Council. He considered the majority of the burgesses of the borough were in favour of the proposal. If another £500 was added to the amount of the purchase-money, still the Corporation would have a bargain. He moved that the Council enter into a provisional contract with the Directors for the purchase of the works for £3300. Mr. Pearce seconded the motion. Mr. Moor, a Director of the Company, said he felt sure this was one of the best investments which the Council had ever entered upon. Mr. Eldridge, also a Director, gave a list of accounts, showing that within the last ten years the sum of £958 odd had been laid out by the Company in repairs only. He favoured the purchase of the works. The resolution was carried *nem. con.* The draft provisional contract for the purchase was read; and on the motion of the Mayor, it was adopted.

AUSTRIAN INCANDESCENT SHARE COMPANY, LIMITED.

The First Annual General Meeting of this Company was held last Wednesday, at the Cannon Street Hotel, E.C.—Major-General G. D. BERESFORD in the chair.

The SECRETARY (Mr. L. de Fonblanque) having read the notice convening the meeting, the report and accounts, to which reference was made in the JOURNAL last week, were presented.

The CHAIRMAN, in moving the adoption of the report, said that when, in February last, the prospectus of the Company was issued, it was scarcely anticipated that there would be such a highly satisfactory report to submit eight months later as it fell to his lot to present at that meeting. They foreshadowed that the Vienna Company would be able to pay a dividend of 75 per cent.; and they were actually able to pay 100 per cent., after writing off a further 500,000fl., and without touching the profits realized on the sales of patents and licences. Following the policy of past years, the Vienna Company had only declared a dividend of 80 per cent.—the balance of 20 per cent. having been carried to next year's profit and loss account; so that the dividend of 1896 would be increased by this amount. The 80 per cent. declared by the Vienna Company put at the disposal of the Austrian Company the sum of £51,000, out of which was recommended a payment of 15 per cent., free of income-tax. This they considered to be thoroughly satisfactory, more especially when it was taken in conjunction with the actual financial position of the Vienna Company. Looking at the profit and loss account of that Company, it would be found that the profit on trading and the receipts for licences amounted to more than 2,000,000fl. for the past year. The way they had to consider this was from the general position to-day, as well as the future, of incandescent gas lighting throughout the world. For the year ended March 31 last, the English Company had sold about 300,000 of their burners. Since the 1st of April they had sold that number; and they had the best months of the year before them. Approximately, the Foreign Companies had proportionately increased to the same extent. This bore most importantly upon the business of the Vienna Company, who supplied the fluid to make the mantles. The sale of 300,000 burners for the year 1894-5 for England alone meant that for the year 1895-6 about 1,000,000 mantles would be required for the upkeep alone of those 300,000 burners. But, in addition to this, must be taken the large number of burners thrown out before, which raised the output very considerably. At the present time, the Incandescent Gas-Light Company were manufacturing at their works in Westminster from 14,000 to 15,000 mantles a day; and they were arranging to increase this output to 20,000, which would barely suffice to meet the demands. If they were putting out 20,000 mantles a day, and if for the year 1895-6, as was anticipated, they threw out 750,000 burners, how very greatly increased would the mantle output be next year, when it was taken into consideration that an average of three mantles per burner per annum were required, and that, in addition to the large number of burners now out, there would have to be reckoned all those thrown out in the current year. The business of the London Company was developing by leaps and bounds. At the general meeting of the Company in June, 1894, the Directors were able to announce, with great satisfaction, that the sales for the year had amounted to about 100,000 burners. This was a little more than a year ago. But to-day they were in a position to announce that the sales for one month—viz., October—had approximately reached this figure; and October was by no means the best month of the year for them. As a matter of fact, they were only at the commencement of the business they had to do; and the possibilities of its development were simply limitless. There was every indication that the system would be generally adopted for street lighting; and this field alone was sufficient for a business several times larger than that which the Company were now doing. Moreover, the system had hitherto been confined to coal gas. But there were many other uses for it; and the development of these would lead to its extension on a large scale. There was one other point upon which he would touch before concluding. Those present had doubtless heard that litigation was pending with respect to actions brought by the Incandescent Gas-Light Company against certain other companies for infringement of patents. It was not for him to dilate upon these matters; but he might say that the Directors of the Company awaited the result of these actions with the most complete confidence.

Major C. JONES seconded the motion, and it was carried.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

The Half-Yearly General Meeting of this Company was held last Tuesday, at the London Offices, No. 30, Gracechurch Street, E.C.—Mr. CHARLES GANDON in the chair.

The SECRETARY (Mr. S. Wood, F.C.A.) read the notice convening the meeting; and it was agreed to take as read the report and accounts, which were referred to in the JOURNAL for the 15th ult.

The CHAIRMAN was very sorry to say the report and accounts did not show any appreciable improvement upon those which were put before the shareholders at the previous meeting. On that occasion, he expressed the hope that the reduction which had been made in the price of gas to the private consumers would result in a satisfactory increase both in the consumption and in the number of consumers. Unfortunately, so far, this had not been the case; but, at the same time, he thought perhaps there was some amount of consolation for them in finding that they had more than maintained their own. The gas and meter rental showed a small increase upon the preceding six months. Then as to the profit, that would have been considerably greater than it really was, but for exceptional circumstances. On this occasion, he thought it would be better to compare the figures with those for the December half year, because that was the first one in which there was no revenue from the public lighting; and, so far as making the comparison in other respects was concerned, this was of little importance, as the demand for gas in Georgetown was about the same all the year round. Looking at the revenue account, it would be found that coa had cost £13 less in the past half year. The price per ton had been

slightly lower than in the preceding six months; but the reduction was principally due to a smaller quantity of coal havi g been used, although more gas had been sold. This, he thought, was a satisfactory point so far as it went. The cost of purifying and wages was a little less. Repairs and maintenance figured at £54 higher, which was owing to more than usual having been written off for depreciation of stocks. Although they were unable to show any very brilliant results in working, yet the Directors were anxious to keep the stocks and so forth at their proper value. Therefore, they thought it better to write off a larger sum. Salaries and wages stood at £67 more. The amount under this head would have been less than previously; but they had charged to this account the whole of the expenses of the visit of their Manager (Mr. T. B. Younger) to England this year. As this visit only occurred at intervals of five years, it might have been thought that the expenses could have been put to a suspense account, and only a portion written off each half year; but they considered it better to "take the bull by the horns," and charge the whole of it this half year. Rents showed a small decrease; and the item of Directors' and Auditors' fees, £50, because the Directors had voluntarily agreed to reduce their fees from £300 to £200. Trade and general charges had been reduced by £41. This was not a large amount; but they had endeavoured to economize in every way. On the credit side of the account, the revenue from gas and meter rental was £33 more, which, though small, was satisfactory, as it showed they were not decreasing. Residual products had decreased by £32, which was due to small items. The prices received for coke and tar had not been quite so large as in the previous half year; but, as they used less coal, they had had a smaller quantity of residuals to sell. The result of the half-year's working was a total income of £2434, as against £2433; and the profit was £299, as compared with £291. As he had said, the profit would have been greater but for the amount written off for maintenance, and the expenses of their Manager's visit to England. Since his return to Georgetown, Mr. Younger had been exerting himself to reduce the expenses there. He had effected several notable economies; and it was hoped he would be able to do more in this direction. On the whole, they might look forward to considerable improvement in the results of the current half year, and for several half years to come. He mentioned at the former meeting that they had been endeavouring to introduce the system of prepayment meters at Georgetown. It had been making slow, but steady, progress there. He found for the month of April last the result from the prepayment meters amounted to £8, while in August it was £14; so that the system seemed to be finding favour there. He thought that, if it did not produce them new consumers, it would at all events be the means of avoiding the loss of some of the present ones. The Directors had now sent out upwards of 100 meters. They were not all fixed; but it was hoped they would be soon, and that they would be the means of increasing the income. He concluded by moving the adoption of the report and accounts.

Mr. H. W. ANDREWS seconded the motion, which was carried unanimously.

A dividend was then declared at the rate of 8 per cent. per annum on the preference share capital, and at the rate of 2 per cent. on the ordinary share capital, both less income-tax, except upon dividends payable to local shareholders.

The vacancy which had occurred during the half year by the retirement of one of the Auditors (Mr. J. Manwaring) had been filled by the appointment of Mr. H. J. Hartley; and this was confirmed.

The usual complimentary vote was passed to the various officials, and afterwards to the Chairman and Directors.

The CHAIRMAN, in responding for himself and colleagues, remarked that, although he was very much disappointed at the results of the past few years, he had considerable hopes that the Company would be restored to their former prosperity. With reference to the action of the Directors in voluntarily giving up their fees, he thought it was quite their duty to do so, because they had to ask the officials to bear a portion of the reverses that had fallen upon the concern. If the Directors had not set the example, they could not, with very good grace, have asked the officials to forego anything.

This concluded the proceedings.

ELECTRIC LIGHTING NOTES.

At the Meeting of the St. Pancras Vestry last Wednesday, their Chief Electrical Engineer (Mr. S. W. Baynes) presented a report which is practically a defence of his high-voltage theory. It appears therefrom that the original incandescent Swan lamp was worthless for central station distribution—its voltage being only 50; but when, in 1881, Mr. Edison inaugurated his system with lamps of 100 voltage, the era of higher voltage began. "At this present date," says Mr. Baynes, "the old 50-volt lamp is obsolete, and a number of first-class lamp makers are producing lamps of 8, 16, and 32 candle power and upwards at various voltages up to 250." After referring to the progress made in America since he first introduced the higher voltage movement some two years ago," Mr. Baynes says: "When commencing my duties in St. Pancras, I found that a number of premises had been wired ready for connection to the mains from the King's Road station; and I learned that no instructions had been issued to the wiring contractors as to the subdivision of the circuits so as to enable a supply to be given on a five-wire system. Experience elsewhere has shown that no service line should carry more than from 10 to 15 ampères; and it has become the rule to run the five services into the majority of the houses. In this way a *potential difference of 440 volts frequently exists in the buildings*; but, so far, no trouble has been experienced by the consumer from this cause. Our customers, having their premises already wired, could not readily comply with the requirements consonant with the five-wire system, neither could we call upon them to re-arrange their wiring; but we could supply them with increased voltage, which would only need two service lines, and suit the arrangements already made." Further on, Mr. Baynes claims that a great advantage is the economy in the cost of house services, and that his now famous circular has saved the Vestry something like £5000, inasmuch as the Westinghouse Electric Company, Limited, claim a royalty on Hopkinson's patent, and the money paid on the Stanhope Street mains did not cover the use of a five-wire system over the area supplied by the existing mains; and that, had the five-wire extensions been connected to the old system, and run together, some thousands of pounds would have been demanded. Figures showing the alleged saving are produced; and the writer maintains that, by the introduction of high voltage, more can be done free from royalty than by a conversion of the mains into a five-wire system. Besides all this, Mr. Baynes, in furthering his project, declares that a station delivering current at 220 volts to the lamps will possess the following advantages over that delivering at half pressure: (1) The area that may be covered by the high voltage station is 16 times greater than that of the low, because "with the same expenditure in copper four times the lighting on the mains can be done, or the same amount of lighting at four times the distance with the same percentage loss; (2) there is no reduction of light owing to excessive fall of pressure, because at 220 the variation is so slight; (3) no further transformer sub-stations will be required; (4) the capacity of the Stanhope Street mains may be increased fourfold, but "whether these mains are augmented by the increased voltage or converted into a five-wire arrangement, the risk of breakdown to earth, both on the consumers' premises and on the mains, is unaltered;" and (5) the plant at the higher voltage, being identical with that for electric traction, would afford excellent facilities for combining lighting with electric traction throughout the parish, without any extra generating plant. In conclusion, Mr. Baynes quotes the words of the Provisional Order—section 27 (*e*)—to prove that a pressure of 300 volts is authorized by the Board of Trade; and he adds that, as required by section 27 (*d*), the "standard pressure on the mains" is unaltered, and will remain so. After the Vestry had digested this lengthy document—the foregoing is but a brief epitome of it—the Committee reported that they had received an application from the Engineer's Department of the London County Council, stating that, before they are able to make a final report on the balance (£18,900) of the £75,000 loan applied for, it was absolutely necessary that a plan should be furnished on a 5-feet scale of the whole of the mains laid in the parish. This little job will necessitate the employment of a draughtsman at a salary of two guineas a week—an appointment which was sanctioned.

The Hampstead Vestry were last Thursday called upon to "pay the piper"—in other words, Mr. W. H. Preece presented his little bill for past services rendered to the Vestry as Consulting Electrical Engineer. The various items were jotted here and there over the agenda; but the first of them comprised (A) £1841 15s. 8d., "commission on Messrs. Yerbury's and Siemens's contracts" (£1789 5s. 8d.) and "report, plan, and estimate for general extension of mains" (£52 10s.), less £645 received on account—making a total of £1196 15s. 8d. Another item (B) was for commission on an account of Messrs. Siemens Bros. and Co., Limited, for arc lamps and posts—viz., £7 2s. 10d. on £142 18s. gross; and a third (C), for "plan and detailed estimate of the extension of high and low pressure mains, and arc lighting plant and mains to the High Road, Kilburn, and West End Lane—ordered by the Committee and submitted—2½ per cent. on £6000—£150." Of these items, the first was recommended for payment by the Finance Committee; the second, though passed by the Lighting Committee, was recommended by the Finance Committee to be referred back for further consideration; and of the third, the Finance Committee recommended the Vestry to refuse payment.

The discussion on the first was in respect to the £52 10s., which was questioned by several members; and Mr. Boyse moved that the matter be referred back to the Electric Light Committee for consideration and report. Mr. Greenhill said the Committee were driven to take the course recommended; and, in answer to the Chairman of the Vestry (Mr. H. Hashen, J.P.), the Chairman of the Electric Light Committee (Mr. Thwaites) declared that this item had been thoroughly investigated by his Committee, who agreed that it was a just and proper charge. Mr. J. Aitcheson dissented; declaring that a large minority were of a different opinion. Eventually the motion for reconsideration was lost; and a cheque for £1196 15s. 8d. was ordered to be drawn in favour of Mr. Preece, and another for £11,167 11s. 3d. for Messrs. Siemens's final instalments under Mr. Preece's certificates.

As the two items comprised in (B) were recommended for reconsideration, the Chairman asked what reason the Finance Committee had in refusing payment on Mr. Preece's own certificate. He held, in fact, that the matter could not go back. Nevertheless, Mr. Sharpe moved the rejection of both the items; and Mr. Adams seconded the motion—the latter gentleman explaining that a part of Messrs. Siemens's contract price had been kept back to provide a guarantee in case the work did not turn out well. It had not turned out well, and ought not to be passed. Mr. Greenhill said he personally knew that these arc lamps often went out, and kept flickering; and, since Mr. Preece's certificate had been given, facts had come to the knowledge of the Vestry which proved that these lamps were not working properly. Why should they be passed? If a member ordered gas-fittings, and was assured that they were all right, would he pay for them when he found they were valueless? This contention was supported by another member. The Chairman tried to stem further discussion by hinting at the consequences of "standing the racket of an action." Mr. Thwaites said the certificate was given when the lamps were burning well; but the "strong weather" had affected them. Messrs. Siemens had sent engineers down, and agreed to put them right free; but they "would not undertake any responsibility." Mr. Hanhart contended that perhaps there might be cause for a counter-claim for indemnity against Messrs. Siemens; and he thought it would be wise to withhold payment. Mr. Aitcheson maintained that the Vestry would have to pay. Let the Vestry accept Messrs. Siemens's offer by all means; but the time would come when these lamps would give serious trouble. Major-General Young said if the cheques were not drawn it would be necessary to go to arbitration or law. He moved that they be drawn; and after some further rather sharp discussion, this was done.

On the 2½ per cent. commission claimed by Mr. Preece as being half that to which he was entitled, there was another long wrangle. The item is (C) enumerated above. Mr. Sharpe moved its rejection; and Mr. Aitcheson seconded the motion. The latter described this £150

as the most extravagant charge ever brought before the Vestry. Mr. Preece said he was entitled to 5 per cent., and only charged 2½ per cent. (£150). He only ought to have charged 20 guineas. This would have paid him exceedingly well; and his bill should be returned to him with a request for reduction to a reasonable amount. The Chairman here raised the question of the propriety of one Committee refuting the decisions of another—a practice which he thought was an intolerable nuisance. Mr. Preece was fully entitled to one-half the ordinary commission, if the work was not carried out. This question was discussed with some heat; and Major-General Young advised the Vestry to draw a veil over the past. Mr. Thwaites moved, and Mr. Elliott seconded, that the cheque be drawn. Mr. Johnson considered the Vestry should not pay an amount which it was exceedingly shabby of Mr. Preece to charge. Mr. Ryalls thought the Vestry had better "pay and look pleasant;" and though there had been a vast amount of improvidence in connection with the electric lighting, they must forget it, and hope for a better future. In the end, the motion to pay the amount was lost; and an amendment proposed by Mr. J. Aitcheson, to the effect that the bill be referred back to Mr. Preece, was carried by 24 votes to 17.

Subsequently, without one minute's discussion, the Vestry agreed that the bankers be asked to advance the sum of £19,500 to the electric lighting account, as a temporary loan. After this quick bit of finance, the Committee reported that the cost of the works completed and in progress amounted altogether to £59 400; and that, as only £29,400 had already been obtained, a further loan of £30,000 was required. The Vestry thereupon agreed to apply to the London County Council for their sanction to borrow this sum; and, if granted, to obtain the money at the lowest possible rate of interest.

Colonel Ducat recently attended at the Town Hall, Wolverhampton, to inquire into an application by the Corporation for the sanction of the Local Government Board to the borrowing of £5000 for electric lighting purposes. The Town Clerk (Mr. H. Brevitt) stated that, on July 8, the Corporation agreed to enter into contracts for plant to the amount of £4225; and they required £775 for extending the mains as fresh applications were received. Their object was to enlarge the area of supply. The capacity of the present plant was 8000 8-candle power lamps; and they had already connected 7936, leaving only a margin of 64 lamps. They had 102 customers, representing, inclusive of public lamps, the 7936 lamps. The capacity of the new plant included in the application was nearly 3000 8-candle power lamps. The Inspector afterwards visited the works.

A movement is on foot in Bangor among influential ratepayers to organize a strong opposition to what is known as "the fad" which has been adopted by the Council of establishing an electric light and power plant in the city. Already the rates of the city reach close on 8s. in the pound; and it is feared that, if the Corporation secure the powers they now seek, the rates will be increased.

In the last volume of the JOURNAL, some comments appeared in our "Electric Lighting Memoranda," upon the opposition which had arisen in the electrical trade to the fitting up of the interiors of houses for electric lighting by local authorities owning electric supply works; and special mention was made of some trouble in this respect at Leicester. At a recent meeting of the Corporation, a petition was presented by the electric fitters of the town, urging the Council to withdraw their sanction from the Gas and Electric Lighting Committee doing fitting work. For some twelve or thirteen years, the Committee have undertaken gas-fitting; and they naturally took up the work in connection with the electric light, being desirous that it should be done as well as it possibly could be. The petition alluded to was referred to the Committee for consideration; and, having carefully considered it, they reported at last Tuesday's meeting of the Council that they could not recommend any alteration in the present practice. There was some opposition, but the Committee's decision was upheld.

Some difficulty is being experienced in connection with the transfer of the Exeter electric light undertaking to the Corporation. In answer to the Corporation's inquiry respecting an Order, the Board of Trade point out that it will first be necessary to get the Local Government Board's sanction to the necessary loan, and to conform to all the usual preliminaries. This the Corporation are, of course, prepared to do; but the delay, which had apparently not been contemplated, is attended by serious consequences. New machinery is said to be absolutely necessary to the continuance of the works; and, as things are, neither the Company nor the Corporation have a free hand in ordering it. At a meeting of the Council last Wednesday, it was reported that, since the provisional agreement was entered into, new machinery or appliances to the value of £250 had already been ordered; and the City Surveyor had said that these were not quite the thing he should have obtained had the matter been in his hands. The Council are naturally anxious to get control of the electric light undertaking; but they must, of course, comply with the existing legal formalities as to notices and so on.

The Wimbledon District Council seem determined to have their electric lighting scheme if they can get it. Last Friday, the Local Government Board inquiry into the application of the Council for sanction to borrow £32,000 for the purpose was conducted by Major-General Phipps-Carey, R.E. The case for the Council was conducted by Mr. Fletcher Moulton, Q.C.; the application being opposed, on behalf of the Ratepayers' Association, by Mr. Castle, Q.C., and Mr. Fordham Spence. Mr. Arthur Preece, Assoc.M.Inst.E.E., gave an outline of the scheme; and his evidence was endorsed by Mr. Manville, M.Inst.E.E. Mr. W. H. Preece, C.B., supported the proposals of his son; expressing the opinion that Wimbledon could be lighted far more effectively than at present by means of the incandescent electric system at only a slight increase of cost. Mr. W. Santo Crimp, M.Inst.C.E., said he was strongly in favour of the scheme. On the other hand, Professor Silvanus Thompson—an unquestionable authority—described it as crude. Mr. W. G. Cooke, the Chairman of the Ratepayers' Association, gave his reasons for opposing the project; and one of the oldest ratepayers expressed the opinion that the majority of the residents were satisfied with the existing system of lighting. He said the electric light cost him three times more than gas; and therefore he had given it up. Mr. Moulton having addressed the Inspector, the inquiry closed.

A DANGER OF GAS SUPPLY IN LARGE CYLINDERS.

An accident of a most startling character (the *Cambridge Chronicle* reports) took place, on Monday evening last week, at the Great Eastern Railway Station at Ely, fortunately unattended with personal injury. It is the custom of the Company to send large cylinders containing gas to various stations on their line, for the purpose of being drawn off into smaller receptacles for carriage lighting. Two of these were lying on a long truck in a siding on the east side of the station. The method of extracting the gas is by a flexible tube, to one end of which there is attached a male screw; the receiving sunken screw being within the cylinder itself. The operation of inserting the screw was being conducted by, our contemporary is informed, a man whose general occupation is wheel-tapping or testing, who by misadventure got the screws cross-threaded; the consequence being that the pressure of gas (150 lbs. to the square inch) at once blew out the male screw, knocking the man down, and the gas ignited by contact with his lamp. The situation was critical in the extreme. The orifice gradually became larger through fusion of the softer parts surrounding the inner screw-work. The flames mounted higher and higher, eddying round in the upper air as the gas ascended, in a most remarkable manner. There was no fear of explosion from the cylinder, its contents having ample vent; but the danger rested with the neighbouring one, containing many thousand cubic feet of gas. This became heated almost to whiteness, until it was evident that the gas was greatly expanding, and an explosion was imminent. Suddenly, a bright flame shot up high in the clouds with a sullen roar and concussion that shook the earth for a mile around. The wood-work on the eastern platform was much scorched; and there was great wreckage of windows. The truck also upon which were the gigantic cylinders was destroyed; but it is marvellous that a greater catastrophe did not occur by fire. Nearly half the exploded cylinder (⅜ inch thick, and of great weight) was projected about 150 yards into some gardens.

METROPOLIS WATER SUPPLY.

Dr. Frankland's Report on the Quality of the Water in September.

The returns furnished to the Registrar-General by the London Water Companies regarding the water supply in the Metropolis during September, show that the average daily supply amounted to 226,334,331 gallons, as compared with 194,121,301 gallons in the corresponding month of 1894. The number of services being 820,880, the rate was 276 gallons to each service. Of the entire bulk of water sent out, 119,468,764 gallons were drawn from the Thames, and 106,865,567 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: Taking the average amount of organic impurity in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: New River and Kent, 0·6; Colne Valley and Tottenham, 1·2; East London (deep well), 1·3; Grand Junction and Lambeth, 2; and Chelsea, West Middlesex, Southwark, and East London (river supply), 2·1. The unfiltered river waters contained the following proportions: Thames at Hampton, 3·6; New River Cut, 1·7; and the Lea at Angel Road, 3·5. The Thames at Hampton was, on Sept. 23, turbid and pale yellow in colour; but it was, as raw water, of good chemical and bacterial quality. As delivered by the five Companies drawing from this river, it was in every case efficiently filtered, and of excellent chemical and (with one exception) bacterial quality for dietetic purposes. The bacterial improvement effected by the various Companies is expressed by the following percentage numbers: Chelsea, 99·19; West Middlesex, 99·46; Southwark, (No. 4 filter well) 99·73, (No. 9 filter well) 92·97; Grand Junction, (general well at Hampton) 98·11, (general well at Kew Bridge) 99·19, (South filter well at Kew Bridge) 98·92; and Lambeth, 98·65. The New River Cut, before entering the subsidence and storage reservoirs, was, on Sept. 25, turbid and very pale yellow in colour. It was, for unfiltered water, of excellent chemical quality; but bacterially somewhat inferior to the Thames at Hampton. By passing through the storage reservoirs, the number of bacteria was reduced to less than one-fourth; and, after efficient filtration, the water was delivered to consumers in excellent chemical and bacterial condition for dietetic purposes. Bacterially it was improved before delivery to the extent represented by the following percentage numbers: General filter well, 97·88; No. 9 well, 98·82. The water taken from the Lea by the East London Company at Angel Road on Sept. 25 was turbid and pale yellow in colour. Chemically it was of nearly the same quality as the Thames at Hampton, but bacterially much inferior. It was passing through the storage reservoirs without detention, and actually arrived at the Lea Bridge works with an increased number of microbes per cubic centimetre. After efficient filtration, however, it was delivered in excellent chemical condition for dietetic purposes; while the bacterial improvement was represented by the following percentage numbers: No. 1 Essex well, 96·96; No. 2 Essex well, 99·53; and Middlesex well, 99·3. The deep-well waters of the Kent, Colne Valley, and East London Companies, and of the Tottenham Local Board of Health, were of excellent quality for dietetic purposes; but the East London samples were slightly turbid, owing to repairs in the well. The Colne Valley Company's water had been softened before delivery, and thus rendered suitable for washing. Seen through a stratum 2 feet deep, the Kent, Colne Valley, and Tottenham waters were clear and colourless; the East London (deep well), slightly turbid and colourless; the New River, clear and nearly colourless; and the remaining waters, clear and very pale yellow. The bacterioscopic examination of the raw river waters before and after storage, and the supplies delivered by the various Companies and

collected on the 23rd, 24th, 25th, and 26th of September, yielded the results contained in the following table:—

Description.	No. of Microbes per Cubic Centimetre.	Temperature in Deg. C.
Raw and Stored River Waters.		
Thames at Hampton, Sept. 23	1480	15·0
Thames at Hampton, after storage for 14·7 days (Chelsea Company), Sept. 23	220	16·3
West Middlesex Company's water (supplying filters 1–5), Sept. 24	200	15·3
Grand Junction Company's water arriving at Kew from Hampton, Sept. 24	240	16·4
Grand Junction Company's water at Kew, passing on to filters Nos. 2, 3, and 4, Sept. 24	340	16·3
New River Cut, before passing through reservoirs, Sept. 25	1700	15·2
New River Cut, after passing through reservoirs, just before filtration, Sept. 25	380	14·7
River Lea at Angel Road, Sept. 25	2480	16·5
River Lea, after passing storage reservoirs of East London Company, Sept. 25	3420	16·4
Filtered River Water as Supplied.		
Thames—		
Chelsea Company's general filter well, Sept. 23	12	16·2
West Middlesex Company's general filter well, Sept. 24	8	15·2
Southwark Company's No. 4 filter well, Sept. 23	4	14·4
Southwark Company's No. 9 filter well, Sept. 23	104	14·3
Grand Junction Company's general filter well at Hampton, Sept. 23	28	15·1
Grand Junction Company's general filter well at Kew Bridge, Sept. 24	12	15·7
Grand Junction Company's south filter well at Kew Bridge, Sept. 24	16	16·3
Lambeth Company's general filter well, Sept. 23	20	15·5
Lea—		
New River Company's general filter well, Sept. 25	36	15·0
New River Company's No. 9 filter well, Sept. 25	20	14·9
East London No. 1 Essex well, Sept. 25	104	15·8
East London No. 2 Essex well, Sept. 25	16	16·1
East London Middlesex well, Sept. 25	24	16·1
Deep Well—		
Kent Company's new well at Deptford, Sept. 26	4	11·3

EASTBOURNE AND ITS WATER SUPPLY.

Municipal Water-Works Proposed.

Consequent on some very serious allegations being made in regard to the impurity of the water supply at Eastbourne—mainly due, it is said, to the abnormal amount of salt found in the water—there has been submitted to the Town Council by the Sanitary Committee a report suggesting the establishment of works in competition with those belonging to the Eastbourne Water-Works Company. This report was presented at the meeting of the Council on Monday of last week; and it gives particulars of the action being taken by the Company to remedy every possible cause for complaint. The Company have consulted Dr. Edward Frankland, F.R.S., and Mr. Whitaker, the eminent Geologist; and already one spring containing "an excess of common salt" has been discovered, and works have been commenced to exclude the water of this spring from the Company's wells. Mr. F. K. Bamber, F.I.C., one of the analytical advisers of the Company, tested a sample of water taken from the town supply on the 14th ult., and found that, although it contained an excess of salts, "the water is not at all injurious to the health of those who drink it." Replying to a communication from the Town Clerk, the Secretary of the Company (Mr. F. A. Currey) wrote: "With regard to your statement that there are wells in the town which are supplying good wholesome water, it is important your Committee should understand that the consumption of water in Eastbourne approaches 2 millions of gallons per day; and the wells referred to would only yield a very small fraction of that quantity. The Directors are taking steps to obtain water immediately from the springs at Holywell. Orders have been given for the supply of the engines and machinery required for this purpose; and they will be erected, and set in operation, with as little delay as possible." This was the state of affairs on the 22nd ult., when a meeting was held of the Eastbourne Schoolmasters' Association, who unanimously passed the following resolution: "Having learnt from analyses of samples of water submitted to the County Analyst, that, whereas on or about Sept. 27, 48 grains of chlorine—so called—per gallon were found to be present, on Oct. 19 this amount had risen to 73 grains, this Association, representing as it does all the boys' boarding schools in Eastbourne, begs to inform the Sanitary Committee that the members are altogether dissatisfied with such steps as the Water Company may have hitherto taken to improve the condition of the water. The Association strongly urges the Sanitary Committee to request the Water Company at once to take such steps for the improvement of the water as will satisfy the Committee; and in default to declare that the Committee will at once demand a Local Government Board inquiry, and further will apply to Parliament for powers to deal with the water supply of the town." A deputation from the Association subsequently attended before the Committee, and urged them "to take prompt measures to secure a supply of proper water." The Town Clerk was thereupon instructed to get Counsel's opinion as to the powers of the Corporation; and the following extract from the Committee's minutes gives the result of his action:—

The Town Clerk reported his conference with Counsel, Mr. Shiress Will, Q.C., M.P., who stated that he was now of opinion that the Company had failed to take the steps they ought to have taken to improve the water supply, as required by the Town Clerk on behalf of the Sanitary Committee, and the Council ought to proceed for a Bill (in preference to proceeding under section 52 of the Public Health Act, 1875) for power to provide a water supply for the town. It was resolved unanimously—

(1) That the Committee are dissatisfied with the measures taken by the Water Company to deal with the complaints addressed on their behalf to them, and are satisfied that the water now being supplied to the inhabitants is not a proper supply within the meaning of the Public Health Act, 1875.

(2) That the Council be recommended at once to promote a Bill in Parliament authorizing the Council to provide a supply of pure and wholesome water for the inhabitants, and to instruct the Town Clerk to take the necessary steps in the matter.

(3) That the Council be recommended to appoint an engineer and geologist to prepare plans for the required works, and to advise them upon the sufficiency of the Water Company's proposals.

(4) That the Chairman be requested to make a statement to the Council of the steps which the Committee have been taking during the past few weeks to secure a proper supply of water, and that the Town Clerk inform the Eastbourne Medical Society and the Schoolmasters' Association of these resolutions.

On the above matters coming before the Town Council on Monday last week,

Alderman STRANGE moved the confirmation of the Sanitary Committee's proceedings. He said it would be in the recollection of the Council that some years ago a resolution was brought forward for the purchase of the existing Eastbourne Water-Works; and he thought the time was now fully ripe, and that the Council should rise to the occasion, and go to Parliament without a moment's delay. They should promote a Bill to authorize the Corporation to provide a supply of pure water to the inhabitants. All these vested interests and these monopolies caused a great deal of waste of time by being in the hands of private companies. He thought it would have been to the interest of the Eastbourne public generally if the water supply had been in the possession of the Corporation. He hoped they would get a unanimous vote, so as to be empowered to promote the Bill in the next session of Parliament. It would not only be to the interest of the inhabitants of the town, but to the "fair fame" of Eastbourne, if the supply of such a necessary of life as water were placed in the hands of the municipal authorities.

Mr. WENHAM seconded the resolution. He regretted the Corporation had not purchased the water-works when the matter was last under their consideration, as they would have then been in a position to have grappled, without delay, with the serious evil that now threatened the town, and not have been inclined to spend months in experiments. It was natural that the Company would mainly look at the commercial aspect of the question; and that their chief concern would be as to how much they could save by maintaining the present arrangements. If, however, the supply of water were in the hands of the Corporation, they would at once have gone for a fresh and altogether new supply.

Mr. TOWNER protested that a matter of such magnitude should not be passed without full consideration—seeing that the Council were asked to pledge themselves to an outlay of an enormous amount of money. It must not be forgotten, he said, that the present Water Company had been in existence for the last 40 years; and until now they had given the town every satisfaction. They had always prided themselves on having a very fine supply of water night and day; but, unfortunately, the Company had lately come across some salt spring, which had upset all their calculations. Notwithstanding that the Company were taking steps to remedy the trouble, the Council were now asked to agree to the promotion of a Bill to enable competing works to be established. He did not, however, think there was the slightest chance of such a Bill being passed—at all events, they must be prepared to face a stern fight on behalf of the Water Company, who had a lot of money behind them. Seeing the enormous outlay that would in any event be involved, the matter should be thoroughly well considered; for, of course, there was the alternative suggestion (which he regarded as a better scheme) of getting powers to buy the present Company's undertaking outright. To enable the question to be calmly considered, he proposed, as an amendment, that consideration of the matter be deferred for one month.

Mr. BRADFORD seconded the amendment, thinking it was not necessary for the Council to rush with impetuosity into different schemes that might involve them in an outlay to the extent of some thousands of pounds.

Mr. HILLMAN supported the resolution, as he thought that the right time to approach the Water Company with a proposition in regard to acquiring their plant and undertaking would be when the Council had obtained the parliamentary powers for which they intended to apply next session.

Mr. DUKE also supported the recommendation of the Committee, though when the water-works purchase question was last brought forward he was not in favour of it, seeing that he considered they would be involved in an expenditure of a lot of money without attaining the end they all desired, which was to get a good supply of water as quickly as possible.

Alderman STRANGE, in reply, said the Committee had taken the very best advice in this matter; and he did not think it right for them for one moment to consider the expense involved. Eastbourne was now only on the fringe of the prosperity to which it would attain; and it behoved everyone connected with the town to take all possible means to foster its development. Certainly, he considered that the supply of pure and wholesome water was an essential. Without it, all the educational establishments, for which the town was famous, would suffer; and in this way the whole district would be the poorer. He was strongly of opinion that the Council ought to embrace the present opportunity to promote the Bill suggested by the Sanitary Committee.

The TOWN CLERK having pointed out that, if the amendment were carried, it would mean a delay of twelve months in promoting the Bill—seeing that the necessary Parliamentary Notices must be given before Nov. 30.

The amendment was put, and lost by 5 votes to 22; and the resolution was then carried.

SHEFFIELD AND THE LITTLE DON WATER QUESTION.

Barnsley Invited to Join in the Sheffield Scheme.

The question of the rival projects of water supply from the watershed of the Little Don has been advanced another step by an important communication from the Town Clerk of Sheffield (Mr. H. Bramley) to the Town Clerk of Barnsley. Agreements—the nature of which has been previously stated in the JOURNAL—have been entered into with respect to this matter between the Sheffield Corporation and Rotherham and Doncaster; and now the first-named authority are endeavouring to induce Barnsley, who have a Bill pending before Parliament, to come into the arrangement.

In his letter (which was written by direction of the Water Committee), Mr. Bramley mentions that the Sheffield Corporation have decided to seek powers in the forthcoming session of Parliament to deal with the old watershed of the Little Don in the manner which they are advised, and believe, to be the most economical and advantageous in the interests of the public. The Water Committee, he says, do not admit the right of Barnsley to any supply from the Little Don area; and they are especially opposed to the Barnsley Bill (1) as proposing to use a large portion of the best and purest top waters of the Valley in a wasteful manner, and (2) upon the ground that no new water area should be granted to Barnsley until the remainder of the waters of their present Scout Dyke Valley has been properly brought into use. The Committee are strongly of opinion that, in view of the urgency with which all the remaining resources of the Don Valleys are being sought by the great populations near, any scheme, whether at Ingbirchworth or on the Little Don, which furnishes compensation water for the use of millowners from the pure upper portions of the gathering-grounds, instead of the equally available but less pure areas below, is wasteful; and therefore contrary to public interest, and greatly to be deprecated. The Committee contend, and will (the Town Clerk writes) urge with all possible force, that the waters of the Little Don Valley should be dealt with by one complete and comprehensive scheme to be carried out by the Sheffield Corporation, and that water should be supplied in bulk to the authorities of the other towns in the Don Valley who are seeking to obtain further supplies. So strongly are the Sheffield Committee impressed as to the necessity of thus using the water resources to the best advantage, and as to the general economy and efficiency which will attach to dealing with the Little Don area by one comprehensive scheme in this way, that they feel themselves able, and are willing, if Barnsley will adopt that course, to waive their opposition to Barnsley having any water supply from the Little Don. The Town Clerk was therefore directed, upon that condition, to offer that Sheffield shall undertake to include the requisite powers in their Bill of 1896, and shall, if such Bill be passed, supply to the Corporation of Barnsley, into a tank to be constructed by the latter near Wortley, such a quantity of water as may be agreed, or as Parliament may direct, and either upon terms similar to those set out in the Sheffield agreements with Rotherham and Doncaster, or on such terms as Parliament may determine. This offer, of course, is upon condition that the powers sought by Barnsley to establish works in the Little Don Valley shall not be proceeded with. But, the letter adds, it will be urged that (1) until the waters of the Scout Dyke have been properly utilized, an increased price ought to be paid by Barnsley for any water supplied from the Little Don Valley; and also (2) that as the Lords Committee decided that certain districts mentioned in the Barnsley Bill should not be supplied with water by the Corporation of that borough, a reduction proportionate to the population of such districts should be made in the quantity of water proposed to be acquired by, or supplied to, Barnsley out of the Little Don watershed. The views of the Sheffield Water Committee as expressed in this letter will be laid before the Parliamentary Committee; and the letter will also be relied on as an offer to furnish a supply of water in bulk to Barnsley. The Committee have communicated with the Barnsley Corporation on this subject in sufficient time to enable the latter to apply to Parliament in the next session, should they think fit, for powers to construct works for dealing with the remainder of the Scout Dyke water.

WATER-WORKS EXTENSIONS AT WAKEFIELD.

A Special Meeting of the Wakefield City Council has been held for the purpose of considering recommendations by the Water Committee that a duplicate line of mains should be laid from Ardsley to Wakefield—a portion 18-inch, and the remainder 24-inch—and also that instructions be given to the Engineer (Mr. H. Rofe) to proceed with the preparation of plans, specifications, and estimates for the construction of the Booth Dean and Oxygrains reservoirs. Alderman Booth, the Chairman of the Water Committee, moved the adoption of the recommendations. He said the duplicate mains were necessary in order to provide a better pressure of water for the consumers on the south side of the city, from some of whom there had been many complaints as to a short supply. The motion was seconded by Mr. Bolton. An amendment, referring back the minutes, with the exception of that relating to the duplicate mains, was proposed by Mr. H. Smith, who thought such an important scheme should be left to the Council to deal with after the elections. In the course of a long criticism of the proceedings of the Water Committee, he stated that they were now constructing works at Green Withens which were estimated to cost £150,000; and the Council were now asked to sanction works involving another £150,000. It was believed that, when they decided to go on with the Green Withens scheme, their difficulties would be practically at an end, and the rate-in-aid very much relieved. Mr. Rofe now reported that the total yield of the Green Withens scheme would be 1,241,000 gallons per day, of which 649,297 gallons would be compensation water, leaving 591,703 gallons for disposal in Wakefield. It would appear that for the sake of securing half a million gallons for sale, they were to expend £150,000. The total yield of the undertaking, according to Mr. Rofe, would be 5 million gallons per day, of which about 2 millions were compensation water. The total outlay on the new scheme, leaving out the cost of the old water-works, was roughly £700,000; and the cost of the old works was £210,000. The expenditure for the first part of the scheme, in round figures, was £400,000; and for the second part, for supplying compensation water, about £300,000. He understood that the probable cost of the remaining reservoirs might not be as great as that of the previous ones, as not so much masonry was likely to be required. He entered into a long calculation as to the expenses connected with the undertaking; and said that, with an estimated revenue of £24,000 next year, there would be a deficiency, when working expenses and the contribution to the sinking fund were met, of £19,659. The great incubus of the undertaking was the purchase of the old water-works, involving an expenditure of £7893 a year for 2 million gallons of water. The amendment was seconded by Mr. Riley. Alderman Booth, in his reply, dealt at length with Mr. Smith's arguments. Mr. Rofe, he said, had told them that he did not anticipate any material increase upon the parliamentary estimate for the two new reservoirs, because the work was of a known character. Mr. Smith had said that the principal cost of the Green Withens reservoir was £150,000. But the contract was let for £120,000; and the Clerk of Works had informed the Committee that day that the extras would be more than provided for by the works which would be left undone. The Committee decided that it would be best to proceed with the construction of the two reservoirs. The question had been very deliberately entered into, and very carefully considered. They were urged to defer the matter for the new Council to deal with; and, at the time the construction of the Green Withens reservoir was recommended, it was opposed on the same plea. Unfortunately, this was agreed to; and the result was that the work was delayed. On being put to the vote, the amendment was lost, and the minutes were adopted.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Carburetted water gas, as stated in a report on another page of this issue of the JOURNAL, is about to be introduced into the Edinburgh Corporation Gas-Works. This was not unexpected; but nevertheless there are elements in the process by which the Gas Commissioners have arrived at their decision which might almost fitly be described as staggering. The Commissioners have had the subject of introducing some method of enriching coal gas before them since the beginning of 1893. They were in no hurry in the matter; and it was not till July of 1894 that they made up their minds upon it. Then the resolution—a unanimous one—was to adopt the Peebles process. Shortly afterwards they had carburetted water-gas processes put before them—first one and then another. The first one they inquired into, inspected it at work in a number of places, and were pleased with it. The second one they were asked to delay coming to a decision upon till they should have an opportunity of seeing it at work. This they agreed to do; and now they seem to be all for it, if the owners will offer it cheap enough. There have been practically three steps in their search for the best enriching process—first one forward, when they resolved to adopt an oil-gas method; then one to the right, when they all but made up their minds that the first carburetted water-gas process would be suitable; and then one to the left, when they have almost decided in favour of the process which they inquired second into. This, in the physical world, would bring them back to the spot they occupied when they took their first step. Were it only for one circumstance, I would be inclined to say that this is, in reality, the position of the Commissioners to-day. The circumstance I refer to is that they have only two processes in view, and that they are now in a hurry to get one of them adopted and introduced. The systems are those owned by Messrs. Humphreys and Glasgow and the Economical Gas Apparatus Construction Company respectively. The Commissioners are not without knowledge that there is another process in existence—that worked by the second form of plant invented by Mr. W. Young, of Peebles; for Bailie Kinloch Anderson, on Monday, directly referred to it. But they do not take that system into account; and I think it will strike most of your readers as strange that they should, after having adopted the Peebles process in its first form, because the inventor improved it, throw the whole thing overboard, and fix upon a system which, according to Bailie Kinloch Anderson, their Engineers regarded the Peebles process to be somewhat like. If the process did resemble a carburetted water-gas system, it surely should have had somewhat similar treatment. Has it done so? The Peebles process, according to its second form, is not yet in use anywhere except at Peebles. But neither was one of the other processes in use; and the Commissioners waited for it from February till now—that is, for eight months. Surely they could wait for a few months longer to give a trial to a process which is looked upon as being nearer the ideal than the other two. This may appear a strong statement; but here are the grounds for making it. On Feb. 16 last, Mr. F. T. C. Linton, the Engineer of the Leith works, reporting upon the relative results of the working of the original Peebles plant and the Humphreys and Glasgow plant, said he was "of opinion that a combination of the special advantages of the two processes would ultimately be found the best." On July 25 last, Mr. A. Wilson, of the Dawsholm works of the Glasgow Corporation, speaking as President of the North British Association of Gas Managers, said, in relation to a carburetted water-gas process: "When the apparatus is being employed in making gases of high illuminating power, a considerable amount of tar is produced. . . . From experiments made, there is no doubt that a considerable amount of illuminating value is left in this tar or heavy oil; and the system will never be complete until this illuminating value is completely utilized." Now, the second Peebles plant does combine the special advantages of the two processes; and it also completely utilizes the illuminating value of the tar and heavy oils. The Commissioners could scarcely have been more directly pointed towards the Peebles second plant than they were by Mr. Linton, who is one of their own Engineers, and by Mr. Wilson, who at the time was the nominal head of the

organized gas industry in Scotland. They have passed it by, unless they should yet resolve to moderate the haste which they now display, and take up the position which I indicate above—and which their resolution of Monday is not inconsistent with—of having academically agreed to do a certain thing, but left their minds open as to how they are to do it. I am an advocate of the Peebles system; and I frankly admit it. My justification is, in the first place, that it was through my instrumentality that the process was first brought under the notice of gas engineers in the pages of the JOURNAL; and, in the second place, that wherever it has been adopted—the first form of plant—it has given satisfaction. I am satisfied that the second arrangement of plant would give equal satisfaction. Not having any interest in the process except what I have stated, I am unable to explain why the Company who own the patents have not the second one working yet. I do not say that the Edinburgh and Leith Commissioners should have adopted it; all I contend for is that, taking all the circumstances into account, they should either themselves give it a fair trial, or, if they are too cautious for that, wait, as they have done before, till someone else tests it, and then they could, with their eyes open, select the best process in the market, whichever it was.

At the Commissioners' meeting on Monday, Mr. Mallinson, a workingman representative, endeavoured to get the Commissioners to fix a principle upon which to proceed in granting retiring allowances to all their employees. He thought it was not fair that only those who applied should be considered; and when told that the Commissioners had no power to institute a pension fund, but were always willing to look into any case which might come before them, he said he should advise them all to apply. The subject may come up again.

On Monday afternoon, Provost Blair, of Dumbarton, performed the ceremony of turning on the gas to a new holder of 125,000 cubic feet capacity which has been erected at the gas-works there. A large company, which included a Member of Parliament and the local Sheriff, assembled to witness the event. Mr. James M'Gilchrist, the Manager of the works, who was also Engineer for the new holder, showed his visitors over the works; and the report says that he made some interesting remarks at each department. That, in Mr. M'Gilchrist's hands, may be taken for granted. Provost Blair, before performing his task, addressed the company on the success which had attended their management of the gas-works. When they took the undertaking over in 1873, he said, the make of gas was about 15 million cubic feet a year; and it was now 50 million cubic feet. The price of gas was then 6s. per 1000 cubic feet, with 2s. for meter-rent; it was now half that sum, with no meter-rent. After the ceremony, there was a luncheon in the Elephant Hotel, at which the Contractors for the new holder (the Barrowfield Iron-Works, Limited) presented Provost Blair with a silver loving-cup, bearing an inscription.

On the 30th of October, Mr. Fleming, Treasurer to the Glasgow Gas Trust, reported to a meeting of the Sub-Committee on Finance, that at the close of the preceding month the revenue derived from the sale of residual products during the past four months of the financial year amounted to £27,120, as compared with £28,644 for the corresponding four months of last year. There was thus a decrease of £1524.

The failures of the Glasgow gas consumers to pay up their accounts after falling due must surely be on a very small scale, much to the credit of Mr. Treasurer Fleming and the collectors acting under him. As may be remembered, when the last annual balance-sheet for the Corporation gas undertaking was made up, it was found that at the 31st of May, the close of the financial year, the gas-rents then outstanding were set down at £69,718. This sum has now been more than recovered; for at the 9th of October, when Mr. Fleming made his last report on the subject, there had been paid into the gas treasury the sum of £71,906; so that there had thus been recovered over the estimate not less than £2188.

The hire and sale of gas-stoves, &c., by the Glasgow Corporation Gas Committee continues to make progress. At the end of the month of September of this year, there were in use 12,684 stoves and kitchen range-fittings from the stove-hiring department; and up to that date there had been sold no fewer than 18,250 stoves, range-fittings, gas-fires, burners, &c. It may here be worth while to mention a few statistical data regarding the stove account for the last financial year, as they may be of interest to many Corporation Gas Committees who carry on a similar business. The year began with a stock of stoves, &c., on hire and in store of the value of £22,951; and it ended with a stock which was valued at £26,125, from which there was deducted a sum of £1045 for depreciation. The disbursements during the year included the following sums: For stoves, &c., £2278; for wages and fittings, £1897; as expenses chargeable to repairs, &c., £2949—making a total of £7124. Then, the other side of the account, there were the receipts, including £909 for stoves, fittings, &c., sold; and £4085 in the shape of rents for stoves and range-fittings. The accounts when worked out gave a balance of £1045, which was set down as profit on the year's transactions.

A meeting of the inhabitants of Brechin was held on Monday night, on the subject of the alleged bad quality of gas which the Gas Company have been supplying for the past three months. It was a curious gathering. In the first place, it was a crowded meeting in the town hall; in the second place, it was presided over by Provost Vallentine; and, in the third place, the Provost assumed that the meeting had been got up to try to frighten the Gas Company, in view of the proposal that the town should take over their undertaking. That was very candid, and does not say much for the honour of the public men of the town. The first resolution was a protest against the bad quality of the gas, and a pledge to use every means in their power to have the evils complained of rectified, whatever that may mean. The speaker indulged in what looked very like chaff for a time; but ultimately settled down to state the old grievances about the Gas Company raising the nominal value of their capital from £5 to £10 per share, and paying dividends which were equal to 35 per cent. He also spoke of the canker of greed for large dividends eating into the souls of the Directors. In the second resolution, Dean of Guild Scott proposed that the consumers should not pay their gas accounts, except under a deduction of 33⅓ per cent. He said that some time ago he wrote to the Manager (Mr. J. B. Terrace) complaining about the bad quality of the gas. He received a reply stating that they had a large stock of third-class cannel on hand, for use along with oil gas; and it was possible that the men had been using that coal too freely. A third resolution called for the establishment of a gas-testing station in the town. All the resolutions were adopted unanimously. Two of the speakers were honest enough to say that Mr. Terrace was in no way to blame for the quality of the gas; but the Directors were, for not giving him good material to work with. One speaker said the gas was now greatly improved; and that that was the worst thing the Gas Company could have done, as it showed how easily they could give good gas if they wished to do so. In the same way, I should say that if this indignation meeting was really held with a view to frightening the Gas Company, it was about the worst thing which could have been done, as this showing of their hand will not help the Town Council should they ever come to negotiate with the Company.

There are several incidents at municipal election meetings which I had reserved to write about; but these Notes are already too long. I will only refer to one. At Kilsyth, on Monday night, the ratepayers held a meeting, at which the principal subjects discussed had reference to the Corporation gas administration. There were two complaints—one that the Gas Commissioners went on an excursion from Kilsyth to Aberdeen, at a cost of £14, which was paid out of the gas revenue, but was not entered in the accounts; and the other that during the time of the strike of miners last year, while the people of Kilsyth were being charged 20s. for coal, the Gas Commissioners, along with an order for coal for the gas-works, sent one for a waggon-load for themselves, which they got for 9s. or 10s. per ton, and did not share that coal with the community. I fancy the speciality of the grievance, in both cases, was that the Commissioners were getting something which outsiders did not get. There was some very hot discussion over the matters; and the expressions "not exactly thieves but very near it," and "liars," were used. The meeting seemed to be quite pleased with the action of the Commissioners in the coal incident. With regard to the Aberdeen excursion, it transpired that a ratepayer wrote to Mr. Alex Smith, the Engineer and Manager of the Aberdeen Corporation Gas-Works, asking if the Commissioners visited and inspected the gas-works there; and that Mr. Smith sent the letter to the Gas Manager at Kilsyth, and did not reply to it. Provost Hamilton defended the excursions of the Commissioners to various places, on the ground that they thereby saw what was being done in other gas-works. The excuse was not a particularly strong one; but it seemed to satisfy the general body of the ratepayers, and so long as the charges for these outings is not unreasonable, there can be no objection to them. I think everyone will approve of Mr. Smith's conduct. He could not have done better.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Nov.* 2.

Sulphate of Ammonia.—The quieter tone last noticed has prevailed throughout the week; and in the absence of demand (covering of October contracts being completed), prices have further receded. No doubt considerable buying will be necessary to cover November contracts; but, so far, the buyers seem mainly occupied in depressing the market, with the view, of course, of making more favourable purchases later. The closing quotations are: £8 17s. 6d. f.o.b. Hull; £8 15s. f.o.b. Leith; and £9 f.o.b. Liverpool. Since the spot market has eased off, there is less disposition to buy ahead at prices that would recently have been paid, although, within the last few days, up to £9 10s. f.o.b. Hull, January/March, was obtainable.

Nitrate of Soda is unchanged. On spot, fine quality may be had at 7s. 9d. per cwt.; while refined cargoes for autumn shipment are worth fully 8s. per cwt.

LONDON, *Nov.* 2.

Tar Products.—The increased production has not so far seriously interfered with the value of pitch; but it is undoubtedly a little easier. The present demands of buyers are being supplied; and there is not the same urgency to purchase as existed some little time ago. A good business is being done in benzols; and the improved values continue—50's being dearer. Solvent naphtha is also moving off freely at former rates. Naphthalene salts keep steady, with a good deal of inquiry for forward delivery. A satisfactory business in anthracene is being done at prices quoted below. There is an excellent inquiry for next year's delivery. The tar bases are also receiving some attention; pyridine, notably, being now quoted at 4s. A moderate demand exists for carbolic acid; but no improvement in prices has yet been obtained. Prices realized during the week are as follows: Tar, 19s. to 23s. 6d. Pitch, 35s. west coast; 38s. east coast. Benzols, 90's, 1s. 3½d.; 50's, 1s. 3d. Solvent naphtha, 1s. 2½d. Toluol, 1s. 3½d. Crude, 30 per cent., naphtha, 5d. Naphthalene salts, 25s. to 40s., according to quality. Cresylic acid, white, 1s. 2d.; brown, 10½d. Carbolic acid, 60's, 1s. 6d.; 75's, 1s. 9½d. Anthracene, "A," 1s.; "B," 9½d.

Sulphate of Ammonia.—This market has been very irregular during the week, business having been noted at one port at as low as £8 12s. 6d.; while at others the ruling price was at least £9. A fair amount of business is being done, and to-day's value may be taken at £8 15s. to £9, less 3½ per cent. at all ports. Gas liquor is quoted at 7s. to 8s.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—With the near close of the year, the wages question is attracting a good deal of interest in the coal trade here, as the time is now approaching when the men will, if they consider the state of trade and prices warrant it, be in a position under the Conciliation Board agreement to demand, not only a return of the 10 per cent. reduction which was put in force last year, but to ask for a 5 per cent. advance. The miners have, however, as yet taken no definite steps in this direction; and it seems scarcely probable that anything will be done in the matter until the annual conference of the Miners' Federation, which is to be held in Birmingham in the second week of the New Year, when no doubt the Lancashire Federation, as well as other

districts, will bring forward the wages question. The past summer, it may be added, has been an exceptionally trying period for the miners. Not only has it been one of the worst they have ever experienced as regards restricted employment, but there have been numerous disputes on wages questions and alleged breaches of the Conciliation Board agreement, which resulted at one time in nearly a couple of thousand men being out on strike in various parts of Lancashire. Fortunately these have mostly been settled, or are dying out; and there are now only 300 men on the strike-list of the Lancashire and Cheshire Miners' Federation. Although the men are hoping that trade will sufficiently improve before the end of the year to justify them in asking for better wages, the present position scarcely encourages such a prospect. During the past week or so, it is true, there has been a considerable briskening up in the demand, especially for domestic consumption, with most of the house-coal pits now on practically full time; but prices show no actual general quoted advance. In south-west Lancashire, some of the collieries are making advances of 6d. per ton upon medium qualities; but these are chiefly where under the full market rates was previously being quoted, and the heavy stocks that are held, with short time still very prevalent, stand in the way of any general upward move at present. At the pit mouth, best Wigan Arley remains at about 10s. to 10s. 6d. per ton; Pemberton four-feet and seconds Arley, 8s. 6d. to 9s.; and common house coal, 7s. to 7s. 6d. per ton. Common round coals meet with a rather more active, but still only moderate demand, for general manufacturing purposes, and, with supplies plentiful, continue a drug upon the market. Extremely low sales are made to clear off quantities; the average pit prices being 6s. to 6s. 6d. per ton. With the increased business doing in house coals, there are necessarily larger supplies of engine fuel offering on the market; but these meet with a fair sale. Although surplus supplies are here and there offered at a trifle below full rates, generally prices are steady at about 3s. and 3s. 6d. per ton for common sorts, to 4s. 6d. and 5s. for best qualities of slack, at the pit mouth. Only the most limited business is reported for shipment, and prices continue excessively low; ordinary steam coal being readily obtainable at 7s. to 7s. 3d. per ton, and best qualities from 7s. 6d. to 7s. 9d., delivered at the Garston Docks, or the High Level, Liverpool.

Northern Coal Trade.—There has been increased depression felt in the coal trade of the North during the past week, as far as steam and bunker coals are concerned. The shipments to the Baltic are now low to what they were; and this affects the steam coal collieries greatly—some, indeed, having only worked about half-time during the last week or two. Naturally, this has had an effect on prices, though nominally the alteration has not been great; but there has been more bargaining for cargoes and concessions made by those of the coalowners who wished to secure fuller work at the pits. Best Northumbrian steam coals are steadier at 8s. 3d. per ton f.o.b., because the slight reduction in the price has brought forward some buyers. Second-class steam are lower in sympathy; and steam smalls are rather scarce, and firm at 4s. per ton. Gas coals are now in large demand, both on account of the consumption being increased, and also in order to allow some of the great gas companies to enlarge their stocks for the still heavier demand that arises later in the year. The price that is generally quoted for best Durham gas coals varies from 6s. 6d. to 7s. 3d. per ton f.o.b.; but the latter is simply quoted where collieries have only a limited amount of coal that is not contracted for, and thus they can command better prices for that little. Manufacturing coals are being now sold freely for next year; and while in a few instances a slight advance is obtained on current year's prices, generally the contracts are just renewals in regard to price. Coke is in larger production, but is very firm; and with an enlarged consumption both in the Furness district and locally, and with shipments that are fully an average, the price is maintained at from 14s. 6d. to 15s. per ton f.o.b. for the best Durham kind. Gas coke is steady; and though the production is now large, the local companies are able to keep down the stocks through the continuance of heavy shipments for the Continent especially. There is no alteration in price this week.

Scotch Coal Trade.—No change falls to be reported. The cold weather has had the effect of increasing the domestic consumption; and coalowners issued their usual notice at this season of an advance of prices by from 6d. to 1s. per ton. There is, however, a prospect of a lock-out in the shipbuilding trades on the Clyde, which would throw large quantities of coal on the market; and the notices have been withdrawn till that dispute is settled. For commercial purposes, there is a fairly large demand—or rather consumption, for much of it is under contract, and prices do not rise. The demand by foreign purchasers is improving slightly; but there again there is no movement in prices. The quotations are: Main, 5s. 9d. per ton f.o.b. Glasgow; ell, 6s. 9d. to 7s.; splint, 6s. 3d. to 6s. 6d.; and steam, 7s. 6d. to 7s. 9d. The shipments for the week amounted to 180,761 tons—an increase on the preceding week of 31,986 tons, and as compared with the corresponding week of last year of 73,999 tons. For the year to date, the total shipments have amounted to 6,108,888 tons—an increase over the corresponding period of last year of 2,043,577 tons, but a decrease as compared with the same period in 1893 of 403,965 tons.

The Little Don Water Schemes.—The Rotherham Town Council sat in Committee a short time ago, to consider the question of the water supply of the borough, and what steps should be taken in view of the Water Bills likely to be promoted in the forthcoming session of Parliament. It is understood that a decision was arrived at whereby the Corporations of Sheffield, Rotherham, and Doncaster enter into a mutual arrangement to oppose the Bills of the Barnsley Corporation and the Dewsbury and Heckmondwike authorities; and, further, to promote a Bill in Parliament for the acquisition of the sources of supply in the watersheds of the Little Don and Porter for the future use of the inhabitants of the large centres of population mentioned as parties to the agreement. The arrangement entered into includes terms that each borough should pay in proportion to the water consumed. The Sheffield Corporation have also undertaken, until the powers are obtained and the necessary works completed, to supply Rotherham with any water required from their present reservoirs; the price to be charged being about 5d. per 1000 gallons.

Reduction in the Public Lighting Charge at Wrexham.—The Wrexham Gas Company have informed the Town Council that they have decided to reduce the price of gas consumed in the public lamps by allowing a further discount of 3d. per 1000 cubic feet.

Extension of the Abingdon Water-Works.—At a meeting of the Abingdon Town Council last Tuesday, the question of extending the water-works was discussed. Mr. C. Hawksley reported that he had made an inspection of the works at Wootton, and approved of the construction of two additional adits in connection with the reservoir, so as to facilitate the collection of water from the surrounding spongy rock and also add to the storage capacity. It was resolved to carry out the work.

Water-Works Extensions at Tamworth.—Last Thursday, Major Tulloch, one of the Local Government Board Inspectors, held an inquiry at the Town Hall respecting a joint application for sanction to borrow £1200 for works of water supply; £760 being repayable by the Rural District Council, and £440 by the Town Council. Mr. Shaw, the Clerk to the Joint Water Committee, explained the constitution of that body, and said that, owing to the large number of houses which had been recently erected within the water area, it was necessary that the mains and services should be greatly extended. Some of the work had already been carried out. The application was not opposed.

The Godalming Water-Works Purchase Question.—The proposal of the Corporation of Godalming to purchase the works of the Frith Hill, Godalming, and Farncombe Water Company has been met on most sides by a strong feeling of opposition. This being so, the Directors of the Company have thought well to advise the shareholders to refuse to confirm the resolution they previously passed agreeing to the transfer. The present is regarded as an unfortunate time to bring forward the scheme, as the rates are high, owing chiefly to the action of the Local Government Board in regard to the main drainage; and ratepayers, looking naturally at the question from that point of view, are somewhat reluctant to agree to a scheme which, they consider, is likely to add to their already heavy burdens.

The Suggested Purchase of Falmouth Gas-Works by the Corporation.—The proposal of the Falmouth Corporation that they should purchase the gas-works has been carried a step farther. In answer to an inquiry made at the instance of the Corporation, the Company have written that they have no desire to sell their works, but they will afford every facility for an inspection of the plant by an expert representing the Corporation. This reply was laid before a meeting of the Town Council on Thursday last, with a recommendation by the Gas and Water Committee that Mr. Silverthorne be appointed to go over the works. Some discussion ensued; and it was eventually decided that the matter should be referred to another meeting of the Council, at which there would be a larger attendance than on Thursday.

Extensions at the Workington Gas-Works.—Last Thursday Colonel A. G. Durnford, one of the Local Government Board Inspectors, held an inquiry at Workington, into an application by the Corporation for sanction to borrow £2100 for the purposes of erecting new regenerative retorts and sulphate of ammonia house and plant at the gas-works. The Town Clerk gave the usual facts concerning the rateable value of the town, and the expenditure connected with the gas-works. He mentioned that the total number of consumers was 1899; and the price charged for gas 2s. 6d. per 1000 cubic feet. There were 487 lamps, which were charged to the rates at £2 per lamp. The amount of coal carbonized last year was 6090 tons; and the quantity of gas manufactured was 56 million cubic feet. The profits for the last three years, after making provision for interest and sinking fund, were: 1893, £1286; 1894, £1231; 1895, £1106. They asked that the loan might be extended over a term of twenty years. Mr. Johnston produced plans of the proposed extensions, and explained that some of the old plant was condemned. The retort-settings were on the old system of firing, and were not economical. The application was unopposed.

The Proposed Purchase of the Fylde Water-Works by Local Authorities.—The terms for the purchase of the Fylde Water-Works by the Local Authorities have been agreed to by the Joint Committee, and will shortly be laid before the respective Councils concerned. If a decision is arrived at to purchase, the Joint Committee will approach the Directors of the Company, with the view of avoiding parliamentary proceedings and attendant costs. The authorities concerned in the proposed purchase include the Blackpool Town Council, the Urban Councils of Fleetwood, Lytham, St. Anne's, and Kirkham and the Rural Councils of the Fylde and Garstang. The present capital of the Company is £360,319, divided as follows: "A" stock, £60,000; "B" stock, £158,976; preference stock (1891), £63,000; and debentures, £9251. The loans amount to £60,219; and the balance to £8868. The last report gives the cost of the works up to February at £359,388. The receipts for the last half year amounted to £17,526; and interest, working expenses, &c., totalled to £4614; leaving a profit of £12,912. For some years, the dividends have been 10 per cent. on the "A" stock, 7 per cent. on the "B" stock, and 4 per cent. on the preference stock.

The Bolton Corporation Gas-Works.—Addressing a meeting of the Bolton ratepayers last week, Alderman Miles, J.P., the Chairman of the Gas Committee of the Corporation, gave some interesting particulars as to the department of which he has charge. He pointed out that the works were acquired from the Gas Company in 1872. At the end of the first year's working by the Corporation, they had produced 359 million cubic feet of gas; and the capital expended was £379,556. Last year, after upwards of twenty years' working, they made 777 million cubic feet; and the capital only stood at £523,959. In the first year that the Corporation worked the undertaking, the capital per million cubic feet of gas produced was £1056; and this had been so reduced that in 1894 it stood at £674 per million. The capital had been reduced by more than £70,000; and, in addition, money borrowed for the acquisition of the works to the extent of £34,794 had been paid off. Last year the Gas Department was in a position to hand over £23,000 in relief of the rates; and this being so, a reduction of 2d. in the price of gas was made—bringing it down to 2s. 6d. net. A reduction of 2d. meant a loss to the department of £8000 a year, £1500 of which went to consumers outside the borough. The use of gas-stoves had greatly increased of late. The total number hired out was 1736 cookers, 1705 gas-fires, and 1912 grillers.

The Water Supply of Portway (Staffs.).—At a recent meeting of the Rowley Regis District Council, the Sanitary Committee reported that they had had under consideration the inadequate water supply at Portway and The Throne, and had requested the South Staffordshire Water-Works Company to lay their mains in these districts. The Company, however, declined to take their mains to Portway, saying that the revenue would not remunerate them for the outlay. The Committee considered that it was a grievous matter that parts of the Council's district were without the Company's water; the whole of the Council's district being within the area of the Company. The Committee recommended the Council to inform the Company of this expression of opinion.

Additional Storage and Pumping Plant for the South Staffordshire Water Company.—The South Staffordshire Water Company, who have an unusually large area of supply, are about to construct a service reservoir in accordance with plans prepared by their Engineer (Mr. H. Ashton Hill, Assoc.M.Inst.C.E.). It will be 300 ft. by 140 ft., and 18 feet deep; and it will contain 4¼ million gallons. It is situate in the parish of Shenstone, about 1¼ miles from the Brownhills Station of the London and North-Western Railway. The contract has been let to Mr. Lovatt, of Wolverhampton, who will commence the work forthwith. The Company are also having a duplicate engine for their Fradley pumping-station, near Burton. It is being made by Messrs. Hathorn, Davey, and Co., of Leeds.

Durham Water Supplies.—A Local Government Board inquiry was held last Wednesday, concerning an application by the Rural District Council for permission to borrow £2000 for works of water supply for West Auckland, Evenwood, and Barony. It is proposed that the water shall be taken from the Weardale and Shildon Water Company, whose Engineer (Mr. R. Askwith) said the length of mains required would be about 5¾ miles; and a reservoir would be erected to contain three days' supply. The total cost would be upwards of £4000; but the Company accepted £2000 in view of taking over a fresh source of revenue, and also in recognition of a moral obligation to serve the district. The Inspector subsequently visited the Company's pumping-station, and the district to be served from it.

Arbitration in Connection with the Nidd Water Scheme.—In the JOURNAL for Sept. 3, it was mentioned that arbitration proceedings had been instituted in regard to a claim made upon the Corporation of Bradford by Mr. T. E. Yorke, in respect of an easement, seven or eight miles long and six yards wide, for the new pipe-line from the Nidd Valley reservoir through his estates. The claim is for a sum of about £45,000. The Umpire is Mr. C. Oakley; and the investigation was opened on the 15th ult. at the Surveyors' Institution, Great George Street. Mr. Balfour Browne, Q.C., and Mr. Waugh appeared for Mr. Yorke; Mr. Cripps, Q.C., M.P., represented the Corporation. The inquiry occupied the attention of the Umpire till the 19th ult., when the proceedings were adjourned till the 12th inst., on which day Counsel will sum up the case for their respective clients.

New Water-Works for Rhyl.—At an adjourned meeting of the Rhyl District Council on the 19th ult., the question of the proposed new main and water-tower for Rhyl was discussed on reports presented by Mr. F. Storr, the Engineer, and Mr. L. G. Hall, the Council's Water Engineer. After some discussion, it was proposed that the Council accept Mr. Storr's estimate, and calculate the maximum requirements of Rhyl at 650,000 gallons a day. This was agreed to; and it was then resolved that an 8-inch main be provided. With regard to the main from Pen-y-Cefndy to the centre of Rhyl, it was decided that it should be a 14-inch one. Some discussion took place as to the proposed water-tower; and it being decided that the work be proceeded with at once, the Clerk was instructed to apply to the Local Government Board for power to borrow the required sum—£8254.

The Ghastly Discovery at Beckton.—With reference to the paragraph on the above subject given in last week's JOURNAL on the authority of the Central News, we learn that the facts are as follows: The remains were discovered by some coal trimmers lying on the top of the coals in one of the retort-houses. They were by the wall, and immediately under the platform of the coal railway which runs through the house. The house had been out of action since May last, and was started again early in October. It is assumed that the man, taking advantage of the house being idle, had climbed up the end face of the coal, and laid himself down to sleep in this quiet, out-of-the-way spot, and was, during sleep, overtaken with some fatal illness, and died there. It appears that the man was not under the coals at all; and he was evidently, from the condition of his boots, a tramp, who had made his way into the works in the hope of getting employment.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 917.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Oct.	10½	Alliance & Dublin 10 p. c.	10	24–25	..	4 4 0
100,000	10	,,	7⅞	Do. 7 p. c.	10	16–17	..	4 8 3
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	100	107–109	..	4 11 9
200,000	5	1 May	6½	Bombay, Limited	5	7¼–7¾	..	4 3 10
40,000	5	,,	6½	Do. New	4	5¼–5¾	..	4 10 3
380,000	Stck.	14 Aug.	12	Brentford Consolidated	100	253–258	..	4 13 0
180,000	,,	,,	9	Do. New	100	207–212	..	4 4 11
220,000	Stck.	27 Sept.	11	Brighton & Hove Original	100	227–232	..	4 14 10
933,500	Stck.	29 Aug.	5	Bristol	100	125–130	..	3 16 11
320,000	20	27 Sept.	11½	British	20	54–55	..	4 1 10
50,000	10	29 Aug.	11½	Bromley, Ordinary 10 p. c.	10	22½–23½	..	4 17 10
51,510	10	,,	8½	Do. 7 p. c.	10	18–19	..	4 9 5
328,750	10	12 June	4	Buenos Ayres (New) Limited	10	8½–9	..	4 8 11
200,000	100	1 July	6	Do. 6 p. c. Deb.	100	102–104	..	5 15 5
150,000	20	11 July	8½	Cagliari, Limited	20	31–33	..	5 0 0
550,000	Stck.	6 Oct.	13½	Commercial, Old Stock	100	313–318	..	4 4 11
165,000	,,	,,	10½	Do. New do.	100	237–242	+5	4 6 9
160,762	,,	12 June	4½	Do. 4½ p. c. Deb. do.	100	143–147	..	3 1 3
800,000	Stck.	12 June	13	Continental Union, Limited.	100	280–285	+2	4 11 3
200,000	,,	,,	10	Do. 7 p. c. Pref.	100	215–220	..	4 11 10
535,000	Stck.	29 Aug.	5½	Crystal Palace Ord. 5 p. c. Stk	100	125–130	..	4 0 9
486,000	10	26 July	11	European, Limited	10	25½–26¼	..	4 3 0
354,060	10	,,	11	Do. Partly paid	7½	17–18	..	4 14 3
5,646,590	Stck.	14 Aug.	12½	Gaslight & Coke, A, Ordinary	100	292–296	–1	4 6 2
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	107–112	..	3 11 5
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	282–287	..	3 9 8
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	135–140	..	3 11 5
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	200–205	..	3 13 2
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	193–198	..	3 10 9
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	282–287	..	3 9 8
476,000	,,	,,	6	Do. K, 6 p. c. Prf..	100	167–170	..	3 10 7
1,061,150	,,	12 June	4	Do. 4 p. c. Deb. Stk.	100	135–140	..	2 17 2
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	145–150	..	3 0 0
908,000	,,	,,	6	Do. 6 p. c. do.	100	202–207	..	2 17 11
3,800,000	Stck.	10 May	12	Imperial Continental	100	245–250	..	4 16 0
75,000	5	26 June	6	Malta & Mediterranean, Ltd.	5	6–6¼	..	4 12 4
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p.c. Deb.	100	113–116	..	4 6 2
541,920	20	12 June	5	Monte Video, Limited	20	18–19	..	5 5 3
150,000	5	24 May	8	Oriental, Limited	5	7¼–7¾	..	5 3 2
60,000	5	12 Sept.	7	Ottoman, Limited	5	5–5¼	..	6 7 3
166,870	10	14 Feb.	2	Para, Limited	10	1½–2½	..	8 0 0
				People's Gas of Chicago—				
420,000	100	2 Nov.	6	1st Mtg. Bds.	100	105–110*	+½	5 9 1
500,000	100	4 June	6	2nd Do.	100	102–107	..	5 12 1
150,000	10	16 Oct.	7	San Paulo, Limited	10	11–12	..	5 16 8
500,000	Stck.	29 Aug.	15½	South Metropolitan, A Stock	100	370–375	..	4 2 8
1,359,000	,,	,,	12	Do. B do.	100	308–313	..	3 16 8
308,685	,,	,,	13	Do. C do.	100	325–330	..	3 18 9
800,000	,,	11 July	5	Do. 5 p. c. Deb. Stk.	100	175–178	..	2 16 2
60,000	Stck.	12 Sept.	11½	Tottenham & Edm'nton, "A"	100	230–235	..	4 17 10
				WATER COMPANIES.				
746,021	Stck.	26 June	10	Chelsea, Ordinary	100	294–299	+1	3 6 10
1,719,514	Stck.	16 Oct.	7	East London, Ordinary	100	223–228	..	3 1 5
654,740	,,	26 June	4½	Do. 4½ p. c. Deb. Stk.	100	157–162	..	2 15 6
700,000	50	26 June	7	Grand Junction	50	118–122	..	2 17 5
708,000	Stck.	29 Aug.	12	Kent	100	307–312	..	3 16 11
1,043,800	100	26 June	7½	Lambeth, 10 p. c. max.	100	251–256	–7	2 18 10
406,200	100	,,	7½	Do. 7½ p. c. max.	100	208–213	..	3 10 5
330,000	Stck.	27 Sept.	4	Do. 4 p. c. Deb. Stk.	100	143–148	..	2 13 4
500,000	100	14 Aug.	12⅝	New River, New Shares	100	385–395	..	3 2 9
1,000,000	Stck.	26 July	4	Do. 4 p. c. Deb. Stk.	100	143–148	..	2 14 2
902,300	Stck.	12 June	4	S'thwk & V'xhall, 10 p.c. max.	100	147–152	..	2 12 7
126,500	100	,,	4	Do. D 7½ p.c. do.	100	140–145	..	2 15 2
1,155,066	Stck.	12 June	10	West Middlesex	100	293–298	..	3 7 1

*Ex div

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 800 British Gas-Works
ANDREW STEPHENSON, 182, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.
Telegrams: "Volcanism, London."

W. C. HOLMES & CO., Huddersfield; AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also Improved Patent Rotary Scrubber-Washers.
*** See Advertisement p. II., centre of JOURNAL.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited; Chemical Works, Leeds, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. Sample and Price on application.
OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

OXIDE OF IRON.

FINEST Quality of Natural Bog Ore. Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for, Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and adroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER LINCOLN."

GWYNNE & BEALE'S
PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

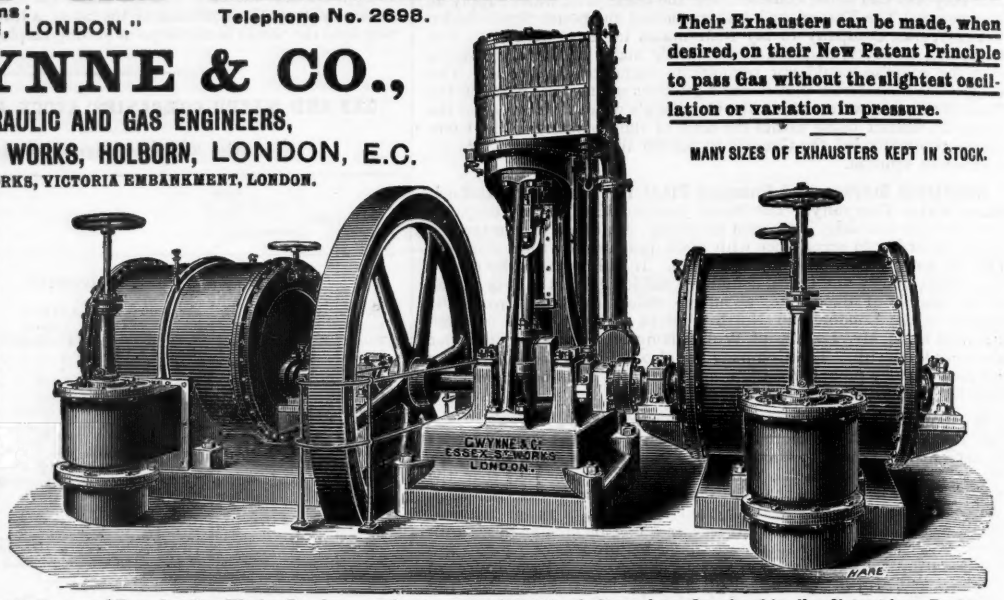
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

AMMONIACAL LIQUOR Wanted.
BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR Wanted.
BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE Wanted.
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS. Correspondence invited.

GOLD MEDAL, 1892.

TUBES and Fittings for Gas, Steam, and Water, in stock to 8 inches diameter; Iron and Steel Ascension-Pipes.
JOHN SPENCER, Globe Tube Works, WEDNESBURY; and 14, Great St. Thomas Apostle, LONDON.

CHARTERING, FORWARDING, AND INSURANCE.

ROBERT BRUCE FITZMAURICE, 29, Great St. Helens, London, Shipping Agent to several Gas Companies and Plant Manufacturers, would be glad to UNDERTAKE LARGE or SMALL SHIPMENTS to any Port.

HUTCHINSON BROTHERS, Gas Engineers, &c., Falcon Works, Barnsley, Makers of Wet and Dry Gas-Meters, Brass-Work, and general Gas Apparatus, Lead Saturators, Tanks, &c., Tools, and Gas-Works Sundries. (See p. 904 last week.)
Telegrams: "HUTCHINSON BROS., BARNSLEY."

BACK-PRESSURE IN PURIFIERS.

THE Valve invented by Mr. Cripps for Bye-Passing any Layer of Purifying Material (referred to by the President of the Incorporated Institution of Gas Engineers in his Inaugural Address) can be obtained of the Makers: C. & W. WALKER, Midland Iron-Works, Donnington, near Newport, SALOP, and J. EVERY & SON, Phœnix Iron-Works, LEWES, to which Firms all inquiries should be addressed.

WANTED, a Situation as Improver to Gas-Fitting, Stove-Fixing, &c.
Address No. 2591, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

YOUNG Man (age 25) wants a Situation as CHIEF CLERK or CLERK in a Gas or Water Company's Office. Would not object to go abroad. Ten years' experience in Gas-Works Office. Good references.
Address No. 2588, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Draughtsman in Gas-Works. Well up in Book-keeping, and used to the supervision of Workmen. No objection to go abroad. Eighteen years' character.
Address No. 2593, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SITUATION wanted in Gas-Works or otherwise. Thoroughly understands Sulphate Making, Rectifying Naphtha. Certificated for Engine Driving. Fair Fitter and Stoker. Good References.
Address E. J. SARGENT, 63, Byrne Road, Balham, LONDON, S.W.

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS, MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

NEW GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS, MANCHESTER.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

SULPHATE OF AMMONIA SATURATORS.

WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

PATENTS FOR INVENTIONS.

J. C. CHAPMAN, M.I.M.E. and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 315, St. Vincent Street, GLASGOW; and 85, Water Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c. CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special Attention to Repairs.
Before placing Orders, please write for Estimate.

A LONDON Firm of Factors desires AGENCIES for Gas and Water Works Specialties and Requisites.
Address No. 2595, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS AND WATER COMPANIES.

EXPERIENCED Accountant, Secretary, or COMMERCIAL MANAGER is open for an Appointment, either Home or Foreign.
Apply, by letter, to No. 2594, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a thoroughly practical Man a Situation as FOREMAN in a Gas Company. Well up in all the Distribution Department—Main Laying, Services, Meters, Stoves, &c. Able to give Estimates for general House Fitting. First-class Testimonials.
Address A. B., 42, Esmond Road, Kilburn, LONDON, N.W.

WANTED, two good Retort Setters at once, for Midland Counties.
Apply, by letter, to No. 2590, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

THE Undersigned is in a position to supply, at the very lowest Prices, the most suitable kind of BENZOL for enriching Gas, made from Hardman's Patent Carbonization Process, of which I am the Sole Patentee. On application, I would furnish Price on the most reasonable terms; giving advice how to utilize it on the most economical method.
J. HARDMAN, Manufacturing Chemist.
Milton, Staffs.

Fourth Edition, Revised and Enlarged.

DESTRUCTIVE DISTILLATION: A Manualette of the Paraffin, Coal Tar, Rosin Oil, and kindred Industries. By PROFESSOR E. J. MILLS, D.Sc., F.R.S. *Imp.* 8vo., 5s.
LONDON: GURNEY AND JACKSON.

GAS-ENGINE, for Sale—One-Horse Power, by Crossley Bros., equal to new. Removed for larger one.
Apply to W. CLARK, 21 and 22, Middle Avenue, The Market, OXFORD.

WANTED, an Inspector and Town Office Attendant. Not over 25. Smart, good address, and excellent references.
Address No. 2589, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Gas-Fitter used to Iron and Compo. Fitting, and Fixing Meters and Stoves.
Apply, stating Wages required and Experience, with *copies* of recent Testimonials, to No. 2592, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Manager for a Country Gas-Works. Yearly make, about 2 Millions. Required to do all Work, including Service Laying, taking Meters, Collecting Accounts, &c. Wages 26s. per week, with House, Coal, and Gas.
Apply, at once, to the SECRETARY, Gas-Works, Milnthorpe, WESTMORELAND.

THE Newmarket Gas Company want a Young Man as SALESMAN for their Show-Room in the Town, who must have a practical knowledge of Gas-Fittings, Heating and Cooking Stoves, and be willing to make himself generally useful. Wages, 28s. per week.
Apply, stating Age and Experience, with *copies only* of Testimonials, to Mr. TROUGHTON, Manager, Gas-Works, NEWMARKET.

GAS MANAGER WANTED.

THE Directors of the Carlow Gas Company will, at their next Meeting on Friday, the 15th of November, at Eleven o'clock, receive APPLICATIONS from competent men, whose entire time will be required by the Company. Salary £80 per annum, with Residence, Fuel, and Light. Personal attendance will be required.
Apply to EAMES ROGERS, Secretary.

TO BE SOLD the Patent—viz., The Secret of a TESTED PROCESS for making the body of INCANDESCENT GAS-LIGHTS. 350 per cent. Net Profits.

Please address J. D. 491, care of Rudolf Mosse, BERLIN, S.W.

SHIFNAL GASLIGHT AND COKE COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of GAS COAL.

The deliveries to be at Shifnal Station at such times, and in such quantities as may be directed.

Tenders to reach me on or before the 11th inst.

The Directors do not bind themselves to accept the lowest or any tender.

BENJ. FARMER,
Secretary and Manager.

TO GASHOLDER MAKERS.

THE Mossley Gas Committee invite TENDERS for the RE-SHEETING of TWO LIFTS and the ADDING of a THIRD LIFT to a Telescopic Gasholder.

The Drawings and Specification may be seen on application to Mr. Merrell, Manager, Gas-Works, Mossley, and at the Office of Messrs. Thomas Newbigging and Son, 5, Norfolk Street, Manchester.

Quantities and Form of Tender may be obtained from the latter on payment of Two Guineas, which will be returned if a *bond-fide* tender is sent in.

Sealed tenders, endorsed "Gasholder Contract No. 4," to be addressed to the Chairman, Gas Committee, Mossley, and sent so as to reach me not later than Noon, on Saturday, the 16th of November, 1895.

The Committee do not bind themselves to accept the lowest or any tender.

JOSEPH HYDE,
Town Clerk.

Town Hall, Mossley,
Oct. 31, 1895.

SHEFFIELD UNITED GASLIGHT COMPANY.

NEEPSEND STATION.
No. 2 RETORT-HOUSE.

TO ENGINEERS, IRONFOUNDERS, ETC.

THE Directors of this Company invite TENDERS for the Manufacture and Delivery, without Erection, of RETORT-FITTINGS for 96 Retorts, also PLATES and GIRDERS for Stage-Floor for No. 2 Retort-House at their Neepsend Station.

Drawings may be seen, and Bill of Quantities with Specification and Form of Tender obtained, on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bond-fide* tender.

Sealed tenders, endorsed "Tender for Retort-Fittings," to be delivered by post to the undersigned, at the Company's Offices, on or before Saturday, the 30th day of November.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Nov. 2, 1895.

SHEFFIELD UNITED GASLIGHT COMPANY.

NEEPSEND STATION.
No. 4 PURIFYING-HOUSE.

TO ENGINEERS, IRONFOUNDERS, ETC.

THE Directors of this Company invite TENDERS for the supply and erection of Four PURIFIERS, 42 ft. by 21 ft., together with Covers, Lifting Apparatus, Valve, and Connections, and also CAST-IRON GIRDERS and COLUMNS to form FLOOR for carrying the same for No. 4 Purifying-House at their Neepsend Station.

Drawings and Specification may be seen, and Bill of Quantities with Form of Tender obtained, on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bond-fide* tender.

Sealed tenders, endorsed "Tender for Purifiers," to be delivered by post to the undersigned, at the Company's Offices, on or before Saturday, the 30th day of November.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Nov. 2, 1895.

SHEFFIELD UNITED GASLIGHT COMPANY.

NEEPSEND STATION.
No. 4 PURIFYING-HOUSE.

TO STEEL JOIST MANUFACTURERS,
CONTRACTORS, ETC.

THE Directors of this Company invite TENDERS for the Manufacture and Delivery, without Erection, of a ROLLED STEEL GIRDER FLOOR, 99 ft. 3 in. long, by 65 ft. 3 in. wide, for their No. 4 Purifying-House at their Neepsend Station.

Drawings may be seen, and copy of Specification with Bill of Quantities and Form of Tender obtained, upon application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bond-fide* tender.

Sealed tenders, endorsed "Tender for Oxide-Floor Girders," to be delivered by post to the undersigned, at the Company's Offices, on or before Saturday, the 30th day of November.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Nov. 2, 1895.

BOROUGH OF STOKE-UPON-TRENT.

TO IRONFOUNDERS.

THE Gas Committee of the Corporation invite TENDERS for the construction and erection of Two PURIFIERS, 25 ft. by 25 ft. by 5 ft., for their Gas-Works.

Drawings and Specifications can be seen on application to W. Prince, Engineer and Manager, Gas Offices, Wharf Street.

Sealed tenders are to be sent in, addressed to Councillor F. Geen, Chairman, Gas-Works, Stoke-upon-Trent, on or before Wednesday, the 13th day of November, 1895, endorsed on the outside "Tender for Purifiers."

The lowest or any tender not necessarily accepted.

By order,
J. B. ASHWELL,
Town Clerk.

TO ENGINEERS AND IRONFOUNDERS.

COUNTY BOROUGH OF BURY.

THE Gas Committee of the Corporation of Bury invite TENDERS for the supply and fixing of sundry CAST, WROUGHT IRON, and STEEL MOUNTINGS of Retort-Benches and Stage-Floors, in connection with their Gas-Works at Elton, Bury, pursuant to the Drawings and Specification prepared by Mr. W. H. S. Gendall, Gas Engineer and Manager, from whom further Particulars may be obtained, and also copies of the Specification, with Quantities and Forms of Tender, on payment of One Guinea, which sum will be returned upon receipt of a *bond-fide* Tender.

Tenders, endorsed "Tender for Retort-Fittings," to be sent to me the undersigned on or before Monday, the 25th inst.

Preference will be given to those persons or firms who pay to their workpeople the regular standard rate of wages obtaining at the time in the town or district.

JOHN HASLAM,
Town Clerk.

Corporation Offices, Bury,
Nov. 1, 1895.

TO RETORT & FIRE-BRICK MANUFACTURERS.

THE Corporation of Bury are prepared to receive TENDERS for RETORTS, FIRE-BRICKS, and FIRE-CLAY required at their Gas-Works.

Forms of Tender may be obtained from Mr. W. H. S. Gendall, Gas Engineer and Manager, Elton, Bury.

Tenders, sealed and endorsed "Tender for Retorts, &c.," to be sent to me not later than Monday, the 25th day of November, 1895.

Preference will be given to those persons or firms who pay to their workpeople the regular standard rate of wages obtaining at the time in the town or district.

JOHN HASLAM,
Town Clerk.

Corporation Offices, Bury,
Nov. 1, 1895.

BROMLEY GAS CONSUMERS' COMPANY.

ISSUE OF THREE-AND-A-HALF PER CENT. DEBENTURE STOCK.

SALE BY TENDER.

MINIMUM PRICE, £105 PER CENT.

THE Directors invite Tenders for £18,000 of DEBENTURE STOCK, authorized to be raised under the Bromley Gas Act, 1879, which will bear a fixed and perpetual preferential rate of Interest of Three Pounds Ten Shillings per cent. per annum, payable Half Yearly (subject to Income-Tax). Allotments to the highest bidders.

Tenders must be delivered on or before Wednesday, the 20th of November, 1895.

Forms of Tender, with Particulars and Conditions, may be obtained, on application, from the Secretary, at the Company's Offices, the Works, Homesdale Road, Bromley, Kent; or from the Company's Bankers, Messrs. Robarts, Lubbock, and Co., 15, Lombard Street, London, E.C.; or from Messrs. Willett and Latter, Solicitors, Bromley, Kent.

By order of the Directors,
HENRY WILLIAM AMOS,
Secretary.

Bromley, Kent,
Oct. 28, 1895.

BY ORDER OF THE DIRECTORS OF THE BARNET DISTRICT GAS AND WATER COMPANY.

£5820 of "D" Gas Capital Stock, being a further portion of the Gas Stock authorized to be raised by the Barnet District Gas and Water Act of 1883. The Maximum Dividend is 7 per cent.; the last Dividend paid on the same class of Stock having been at the rate of £6 6s. per Cent. per Annum.

MR. ALFRED RICHARDS will sell the above, by AUCTION, at the Mart, E.C., on Thursday, Dec. 5, at Two o'clock precisely, in Lots.

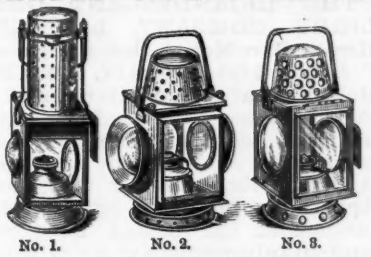
Particulars at the place of Sale; of ALFRED LASS, Esq., Secretary of the Company, 30, GRACECHURCH STREET, E.C.; of C. A. BANNISTER, Esq., Solicitor, 70, BASINGHALL STREET, E.C.; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

Price 15s., Limp Cloth, the Fifteenth Yearly

ANALYSIS OF THE ACCOUNTS
OF THE
Metropolitan Water Companies,
Compiled and arranged by
ALFRED LASS, F.C.A.

LONDON:
WALTER KING, 11, Bolt Court, Fleet Street, E.C.

ARMSTRONG'S PATENT
CANDLE SAFETY LAMPS.



No. 1. No. 2. No. 3.

43, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

Every
ENGINEER
should see
our

AUTOMATIC
Non-
Triturating
COKE
CONVEYOR.
LABOUR

NEW CONVEYOR CO., LD.
3 & 4, LIME STREET SQUARE,
LONDON, E.C.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS:—

Yield of Gas Per Ton. . 11,205 Cubic Feet.
Illuminating Power, 16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality) 13¾ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton. . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . 13¼ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COAL-FIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

NOTICE.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, Hereby Give Notice, that a Firm of F. J. Putz & Co., 16 and 17, Great St. Helen's, London, are advertising for sale Incandescent Gas-Light Apparatus called the "Champion" Incandescent Gas-Burner, and are stating in their circular that such Apparatus may be legally sold throughout the United Kingdom without Infringement of any existing Patent.

This is to Give Notice to the Public and the Trade that Actions for Infringement of Patent and for an Injunction will be immediately commenced by the Incandescent Gas-Light Company, Limited, against any persons using or selling such Apparatus.

The validity of the Company's Patents has already been certified by Mr. Justice Romer; and Solicitor and Client costs will be enforced in all cases.

FAITHFULL & OWEN,
11, Victoria Street, S.W.
Solicitors for the Incandescent Gas-Light Company, Limited.

NOTICE.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, Hereby Give Notice, that they only supply their Mantles subject to the following express Conditions, which are printed and pasted on each box:—

"The Incandescent Gas-Light Company Limited, in supplying the Mantle contained in this box, grant a Limited License to the purchaser to sell or use the same on the express condition that neither the purchaser nor any other person into whose hands the same may come shall use or sell the said Mantle except in connection, or for use, with Burners sold or supplied by the Company; any other sale or use will amount to Infringement of the Company's Patents. The Company supply Mantles for the purpose of renewals at the nominal price of 1s. 3d., subject to the Conditions and Limitations above set forth."

In the case of *The Incandescent Gas-Light Company, Limited v. Cantelo,* **Mr. Justice Wills upheld the Validity of these Conditions and Limited License; and, in the course of his Judgment, said:—**

The patentee has the sole right of using and selling the articles; and he may prevent anybody from dealing with them at all. Inasmuch as he has the right to prevent people from using them or dealing in them at all, he has the right to do the lesser thing—that is to say, to impose his own conditions. It does not matter how unreasonable or how absurd the conditions are. It does not matter what they are if he says at the time when the purchaser proposes to buy, or the person proposes to take a license: 'Mind I only give you this license on this condition;' and the purchaser is free to leave it or take it as he likes. If he takes it, he must be bound by the condition."

In the case of *The Incandescent Gas-Light Company v. Hirschfeld and Others,* **the Honourable Mr. Justice Romer certified that the Validity of the Plaintiffs' Patents was established. Infringers in future will be liable to costs as between Solicitor and Client.**

(Signed) FAITHFULL & OWEN,
Solicitors for the Incandescent Gas-Light Company, Limited.

Limp Cloth. Price 6d.
ARCHITECTS AND SURVEYORS'
HANDBOOK OF GAS-FITTING.
(Tables and Rules by ARTHUR H. CRUMP.)
JAMES STOTT AND Co., 174, Fleet Street, London, E.C.

THORNLEY GAS COALS
WORKED BY THE
WEARDALE IRON & COAL Co., Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

For Price, &c apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

PIPES, 2-in. to 8-in. PIPES, 2-in. to 8-in. PIPES.
MONIER-WILLIAMS & Co.
IRONFOUNDERS,
MIDDLESBROUGH.

BOLDON GAS COALS.
Worked by THE HARTON COAL CO., LTD.
Output about 3000 tons per day.

Analysis—		
Yield of Gas per ton . .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the
HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.
W. H. PARKINSON,
FITTER.

LONDONDERRY GAS COALS
FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.
Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO
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OXIDE OF IRON.
JAMES HUNTER, MINER, AND SHIPPER OF
NATURAL IRISH BOG ORE.
This Estate yields the finest and most uniform quality in Ireland; and the quality is guaranteed.
Samples and Prices on application.
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Telegrams: "HUNTER, PORT GLASGOW."
Established 1872.

KENT'S THICK GAS COAL
RAISED AT
The Wharncliffe Woodmoor Colliery,
BARNSLEY.

Yield of Gas, nearly 12,000 *Cubic Feet per ton of Coal; and Illuminating Power nearly* 17½ *Candles.*

The following is a complete ANALYSIS made by Mr. R. O. PATERSON, C.E., Gas-Works, Cheltenham:—

Specific Gravity (Water 1). .	1·276
Weight of One Cubic Foot. .	79·700 lbs.

PROXIMATE ANALYSIS.

Moisture in Coal	2·68 per cent.
Volatile Matter.	35·60 ,,
Fixed Carbon	58·80 ,,
Sulphur	0·96 ,,
Ash.	1·96 ,,

COMMERCIAL ANALYSIS.

Gas per Ton of Coal	11,760 cub. feet.
Gas per Cubic Foot of Coal .	418 ,,
Illuminating Power	17·44 candles.
Value of One Cubic Foot in Sperm	418 grains.
Value per Ton of Coal in Sperm	703 lbs.
Coke per Ton of Coal . . .	1367 ,,
Coke	61·05 per cent.
Ash in Coke	3·21 ,,
Sulphur Eliminated with Volatile Products per Ton of Coal	9·4 lbs.
Sulphur in Coke per Ton of Coal	12 ,,
Ammoniacal Liquor per Ton of Coal	19·7 galls.
Tar per Ton of Coal	12·2 ,,

R. O. PATERSON, C.E.
Gas-Works, Cheltenham,
8th August, 1894.

For Price, &c., apply to the
Wharncliffe Woodmoor Colliery Co
LIMITED,
BARNSLEY;
Or to Mr. W. H. HARVEY,
17, Old Queen Street, Westminster, S.W.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
Shipments Promptly and Carefully Executed.

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HEBBURN MAIN GAS COALS.
Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.
For prices, f.o.b. Ship or Delivered by Rail, apply to
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B Lombard Street,
NEWCASTLE-ON-TYNE.
W. RICHARDSON, Fitter.

THOMAS TURTON AND SONS, Limited,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
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AND ENGINEERS' TOOLS GENERALLY.
London Office:
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NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.
QUOTATIONS ON APPLICATION TO
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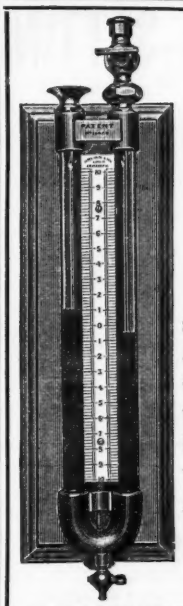
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.



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By merely slackening a screw at the base, the Gauge can be taken to pieces. Can be jointed with either Asbestos, Leather, or Rubber.

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TYNE BOGHEAD CANNEL.
Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.
Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.
Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE & SONS,
Coal Owners, Newcastle-on-Tyne;
or
E. FOSTER & CO.,
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R. DEMPSTER & SONS, L^D.

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EMBODYING THE VERY
LATEST IMPROVEMENTS.

GENERATOR FURNACES,
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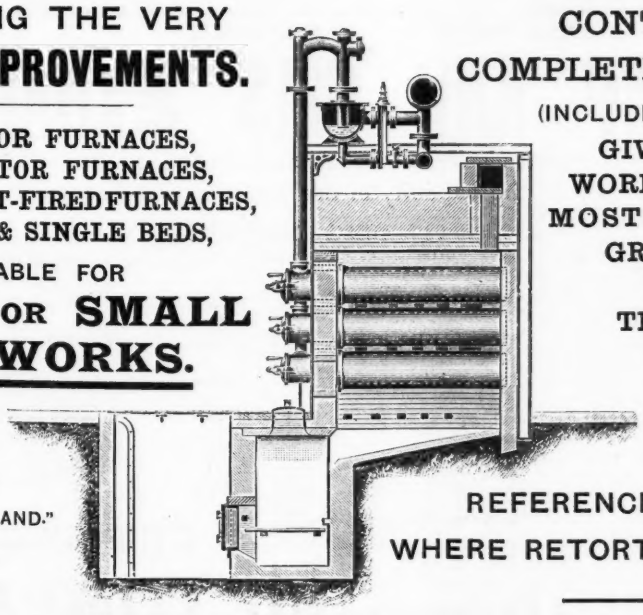
SIMPLE DIRECT-FIRED FURNACES,
THROUGH & SINGLE BEDS,
SUITABLE FOR
LARGE OR SMALL GAS-WORKS.



CONTRACTS FOR
COMPLETE INSTALLATIONS
(INCLUDING ALL FITTINGS),
GIVING THE HIGHEST WORKING RESULTS, THE MOST PERFECT HEATING.
GREATLY INCREASED DURABILITY,
THE LOWEST FUEL CONSUMPTION.

Telegrams:
"DEMPSTER, ELLAND."

REFERENCE TO ENGINEERS
WHERE RETORTS ARE IN OPERATION.

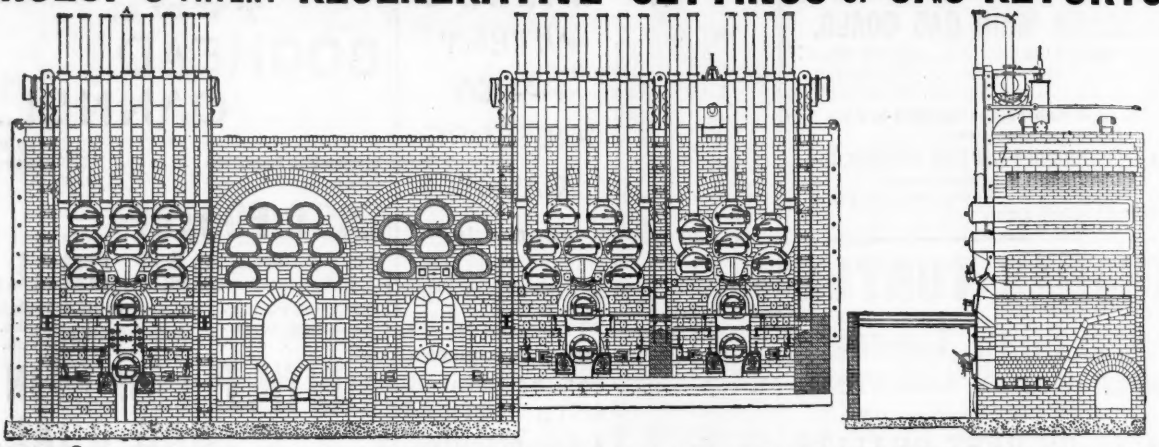
PLANS AND ESTIMATES ON APPLICATION.

COKE-BREAKERS,
PRICES REDUCED.
(THOMAS & SOMERVILLE'S PATENT)
New Design, with two Cutting Rollers, making less Breeze than their old pattern.
GEORGE WALLER & CO.,
PARK STREET, SOUTHWARK, E.C.,
And at STROUD, GLOUCESTERSHIRE.

TAR AND LIQUOR PURCHASED.
JOHN CLARKSON MAJOR,
(Established 1851,)
Tar Distiller and Manufacturing Chemist,
WOLVERHAMPTON.

UNEQUALLED.
Gas Companies are solicited to try Samples of the
MIRFIELD
BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

HISLOP'S PATENT REGENERATIVE SETTINGS OF GAS-RETORTS.



THESE SETTINGS ARE POSITIVELY UNRIVALLED IN PRODUCTIVE CAPACITY, DURABILITY, AND SIMPLICITY OF MANAGEMENT. RETORTS OF ORDINARY DIMENSIONS CARBONIZING FROM 18 TO 24 CWT. OF ENGLISH AND 21 TO 26 CWT. OF SCOTCH COAL PER 24 HOURS, DEPENDING UPON THE NATURE OF THE COAL, AND PRODUCING UP TO FULLY 13,000 CUBIC FEET PER MOUTHPIECE IN THE SAME TIME, AND WITH THE SMALLEST EXPENDITURE OF FUEL ATTAINABLE, AND RETURNING IN PROFIT THE ENTIRE COST OF ERECTION WITHIN TWELVE TO EIGHTEEN MONTHS; AND THUS REDUCING TO INSIGNIFICANCE THE INCREASED COST OF THESE SETTINGS OVER THE COMMON OR GENERATOR FURNACE SYSTEMS.

THESE SETTINGS ARE EXTENSIVELY ADOPTED, AND ARE ERECTED UPON THE SHALLOW AND STAGE FLOOR PLANS. THEY ARE ADAPTED TO ANY EXISTING ARRANGEMENTS, AND PERFECT SATISFACTION GUARANTEED. THE COMPOSITION OF FIRE-RESISTING AND OTHER SPECIAL FIRE-CLAY MATERIALS FURNISHED IS OF THE HIGHEST ORDER; AND THE SYSTEM AS A WHOLE, AS NOW PERFECTED, IS THE RESULT OF LONG EXPERIENCE AND CAREFUL STUDY OF THE PRINCIPLES OF GASEOUS FIRING.

Drawings and Tenders are furnished for the complete erection of Benches, including Retort and Bench Mounting of the most modern and approved description; or existing Ovens fitted up with the Patentee's arrangements.

Full Particulars may be had on application to the Patentee's Agents: **Messrs. JONAS DRAKE AND SON**, Retort Setters and General Carbonizing Engineers, Ovenden, Halifax, Yorkshire, Sole Agents for England, Wales, and Foreign Countries; **C. M. HAMILTON**, Retort Setter and Contractor, 5, Stuart Street, Shawlands, Glasgow, Agent for Scotland and Ireland; and to the Principal Agent, **R. F. HISLOP** (Son of Patentee), General Constructing and Carbonizing Engineer, Gas-Works, Paisley, N.B.

HISLOP'S PATENT HYDRAULIC MAIN SEAL-REGULATING AND TAR-EXTRACTING VALVE is a *Sine qua non*

TO THE SATISFACTORY WORKING OF THE HYDRAULIC MAIN UNDER THE REGENERATIVE AS WELL AS OTHER SYSTEMS OF RETORTS. BEING LARGELY ADOPTED AND AFFORDING THE HIGHEST SATISFACTION.

The Patentee's SELF SEALING CAPS FOR THE TOP OF ASCENSION-PIPES, and his "SPECIAL" FLUE PORT BOXES, are most important additions to his Carbonizing Plant.

SPENT LIMES NO LONGER WASTE PRODUCTS.

Under G. R. HISLOP'S Patents all Spent Limes are effectively recovered at from one-third to one-half the cost of New Lime.
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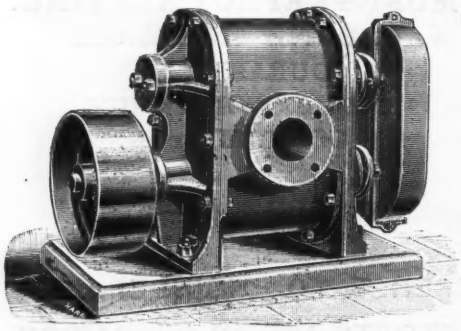
DRUM PUMP AND GAS EXHAUSTER.

The Pump of the future for quickly and economically moving large bodies of Water, Semi-Fluids, &c.

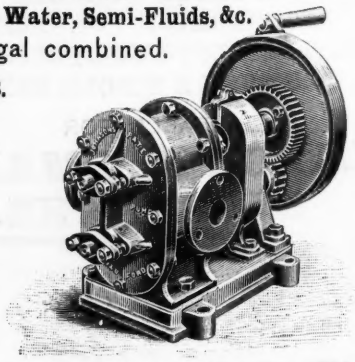
The force of the Piston Pump with the capacity of the Centrifugal combined.

NO SLIDES OR FRICTIONAL WORKING PARTS.



NO PRIMING.

NO VALVES.



As supplied to H.R.H. the Prince of Wales for Pumping Gas Liquor at his Sandringham Gas-Works.

DRUM ENGINEERING COMPANY,
Hydraulic and Pneumatic Engineers, 55, ATHOL ROAD BRADFORD.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of

ALDWARKE MAIN CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 feet of 19-candle gas per ton.
Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.
Telegrams: "ATLAS SHEFFIELD."

PHILADELPHIA EXHIBITION, 1876.

ALSO SILVER MEDAL, PARIS.

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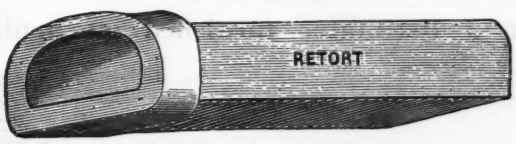

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AND STEEL WORK.

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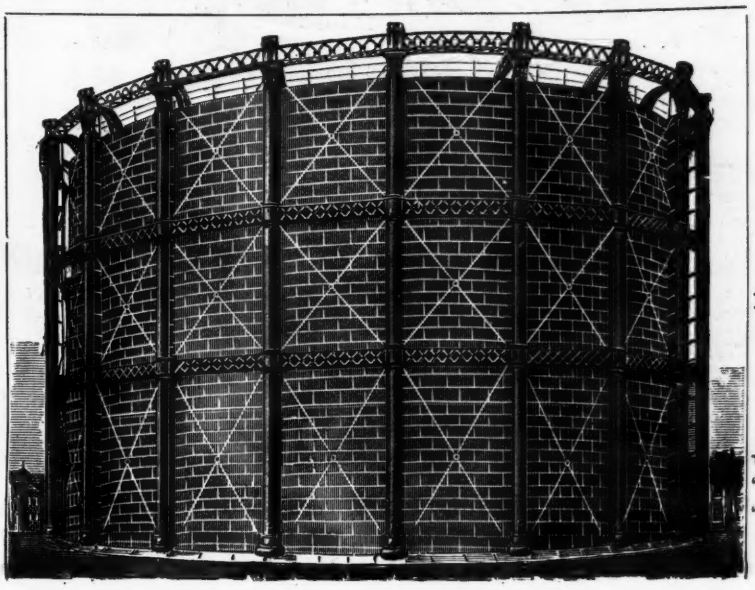

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PATENT AUTOMATIC MACHINERY

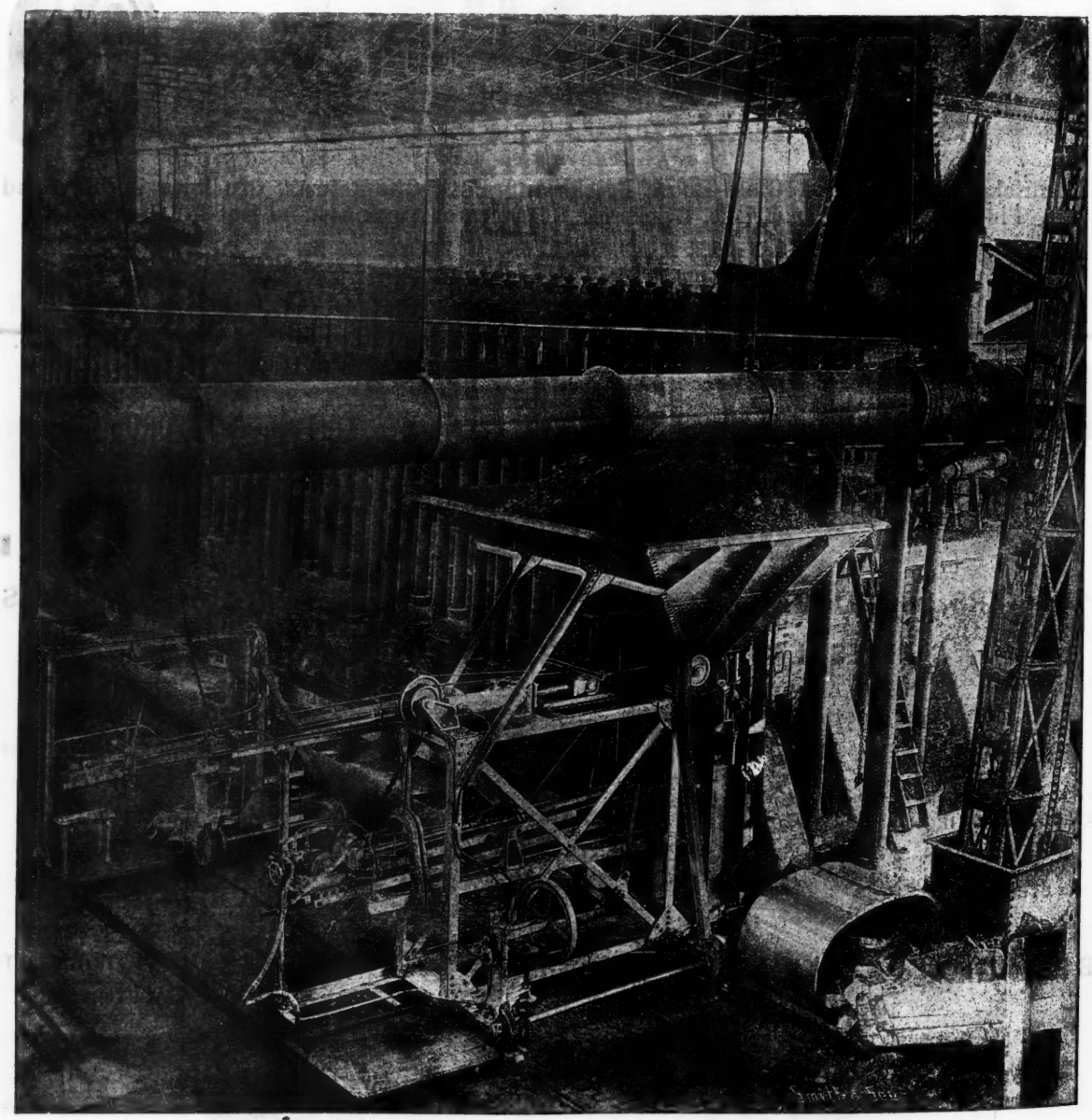
FOR

CHARGING AND DRAWING GAS-RETORTS

SIR WILLIAM ARROL & CO., Ltd., Sole Makers,

GLASGOW.

Plans and Estimates furnished on application.



The above engraving shows the interior of a Retort-House at the Tradeston Gas-Works, Glasgow, where the Machines have been at work since the beginning of 1893, drawing and charging **960 Retorts every 24 hours. 79 Drawing-Machines and 52 Charging-Machines are at work, or in course of construction.**

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LARGEST GASHOLDER IN THE WORLD

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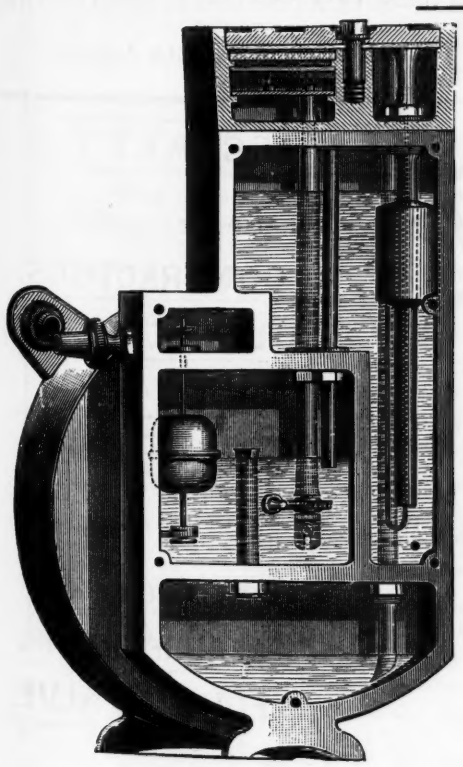

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GREEN'S PATENT UNDERGROUND METER

Has been designed to obviate that which has hitherto prevented the general adoption of underground Meters—namely, their serious cost. No box is required; and the saving thus effected as compared with ordinary underground Meters, where either a box or meter-pillar is necessary, is fully one-half. The price of one for three lights is 28s.; and the other sizes are correspondingly cheap. When fixed, the only part of the Meter exposed to view measures 6½ inches by 3½ inches. By the Indicator with which the Meter is fitted, the Inspector can at once discern whether water is required; but as the Meter is of the compensating description, water will probably need only be supplied ONCE A YEAR. It is advisable to fill the Meter with a non-freezing liquid, which does not injure the fittings; and this can be supplied at about 1s. 3d. per gallon.

Prices and all Information on Application.

NEW GRANGE WORKS, EDINBURGH.

HIGHEST AWARDS given for our WET and DRY METERS at

Exhibitions held at GLASGOW, CALCUTTA, and EDINBURGH.

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Incorporated with the Leeds Fire-Clay Company, Ltd.,

WORTLEY FIRE-CLAY WORKS,

Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON OFFICE:
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Sulphate of Ammonia Apparatus.

The most successful and approved Apparatus known up to the present time.

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NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited, SHADWELL.
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And to the following Gas Companies and Corporations—

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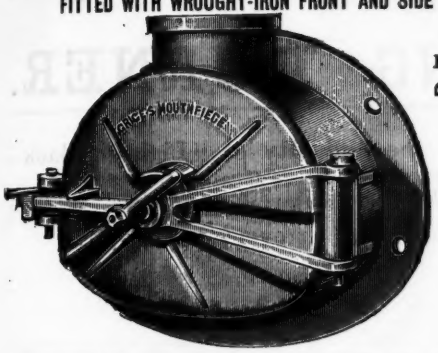

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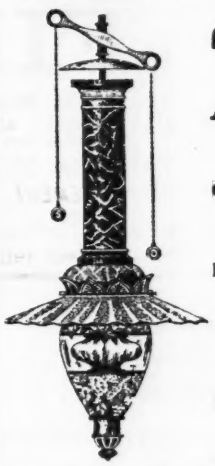

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[See also Advt. p. 914.

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